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VOLUME XV NUMBER 1

MANUAL TRAINING MAGAZINE

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AN INVESTIGATION OF CEMENT AND CONCRETE.

LEON LOYAL WINSLOW.

WE do not know when cementitious materials were first used by the race for constructive purposes. It is a fact, however, that history does not go back far enough to reveal to us the name of a discoverer; its use is as ancient as civilization. This is testified to by remains which have been found in Europe, in Asia, and in Mexico, Central America, and Peru. These remains teach us that, in prehistoric times, men had discovered the art of compounding cementitious materials in a masterly and workmanlike way; that the processes employed by them were much the same as those practiced today; and that the materials in both cases were about the same. The lime and gypsum plasters of the Egyptians, which date back four thousand years, compare favorably with those of modern times, while the lime stuccos of Greek origin are regarded as of a superior quality when judged by present-day standards. The Greeks often covered the walls of their temples, both inside and out, with stuccos which are still in an excellent state of preservation. The great wall of China was built largely of concrete, and some authorities tell us that the pyramid of Cheops contains a great amount of concrete.

The Twentieth Century has been called "The Concrete Age", but it has been estimated that, in proportion to the amount of building going on, the ancient Romans at one time used as great an amount of concrete for constructive purposes as we are using today. It has been thought by some that the concrete used by the Romans was made differently by them than by other nations, and that the art has been lost. But recent investigation has shown that the cementitious material then used was merely lime, and that the excellence of the resulting

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product was due, in part, to the volcanic ash or scoria used, in which silica was present in a soluble condition ready to combine with the lime. But the main reason for the superiority of the old Roman concrete is due to the fact that it was carefully prepared.

Henry S. Spackman, head of the Spackman Engineering Company of Philadelphia, writes as follows concerning the subject in question:

> I have carefully examined samples of mortar taken by myself from the Bath of Tiberius at Capri, built about 100 A. D., from the ruins of an old castle built about 900, from the ruins of another castle built about 1,400, from the fortifications built about 100 years ago, and from the construction dating back only a few years, and found them identical in their character. In all of these the volcanic ash or puzzolan, of which there are large deposits on the island (Sicily), was used instead of sand and in many instances pieces of the early Roman concrete made from the same materials were used, mixed with the stone in the masonry of later construction, and that these blocks of concrete in turn had been made from the fragments of still older construction was indicated by the fact that you could find in them pieces of brick and marble, as well as of broken limestone, the characteristic stone of the island.

With the fall of Rome, concrete construction gave way to stone, a fact which we may attribute to the lack of knowledge of the material, upon the part of the invader.

But we may still regard the *early* Romans as the greatest users of concrete, with the possible exception of ourselves. They carried the art into the barbarous countries as they conquered them, and established its use thruout the then known world. From that time on it has never been entirely abandoned. We are told by Mr. Spackman that the castle of Badajos in Spain still bears marks of the boarded frames in which the concrete was deposited.

It is true that ancient cements differed, oftentimes, from those of today. It has been shown by analysis that mortar taken from the amphitheater at Cubbio, Italy, contained an unusually low percentage of lime. In this respect we find that the mortar used was somewhat different from Portland cement. It is diffcult for us to determine the methods used by the ancients in preparing and mixing their cements as no written records state regarding it. It has been recorded in medieval writings, however, that blood, waxes, beer, milk, sugar, rye flour, and the whites of eggs were used in the mixtures of that time either to hasten or to retard the set, or to produce a chemical change. The use of sugar was a common practice in India.

EXTENSIVE USE IN CONSTRUCTION.

From what has been said it will be seen that the use of concrete for constructive purposes is by no means new. Today its use is universal, a fact which we may attribute to five factors, i.e., cheapness, convenience, durability, strength in compression, and fire-resisting qualities. It is used in the construction of dock-walls, breakwaters, building foundations and caissons, piles, bridges, culverts, sewers, subways, and garden furniture. Its uses have become as universal as the material itself. Entire houses are sometimes built of it and its adaptability to problems in furniture making is being seriously investigated. As a building material stone is extremely expensive; yet concrete is superior to stone both in compression strength and in durability, as a building material. Timber is becoming scarce and more and more expensive, while its functions in industry are gradually being usurped by concrete. Even fence posts of this material are now upon the market.

Altho its uses are becoming complex, the making of concrete is, in itself, a simple process. Concrete may be defined as a material consisting generally of a mixture of broken stone, sand, and some kind of cement, mixed with water. The water combining chemically with the cement conglomerates the whole mixture into a solid stonelike mass. The component materials may be found in practically all parts of the world.

For convenience in classifying the constituents of concrete, we speak of the lime or cement as *matrix;* the broken stone, or hard material, including the sand, as *aggregate.* It is the chemical action of the water upon the matrix which causes concrete to solidify. The most common matrix used is Portland cement, the strongest and best cement made. Before discussing Portland cement, however, we will treat briefly of pozzuolanic cement which is of a more crude form. Both of the cements named are *hydraulic,* which signifies that they resist, when set, the action of water, and under favorable conditions, will set under water. Such materials as plaster of Paris, cement plaster, and Keene's gypsum cement are called non-hydraulic as they are decomposed by water, and, of course, will not set under water.

HYDRAULIC CEMENTS.

The ancients knew that certain limes, when set, would resist the action of water. These limes had been found to do so in their natural

states. They had discovered what is known to us as ordinary lime, too; and they had found out that a mixture of this lime with silicious materials such as pozzuolana or tufa would also set and become hydraulic. The first artificial cement had thus been made.

Today pure lime is formed by heating chalk or limestone in a kiln until its carbonic acid has been driven off. The process is called burning. If pure lime, thus obtained, is mixed with sand and water the lime at once *slakes* and we have common mortar, the setting of which is simply a drying out of the water. But in order to produce a pozzuolanic cement which is hydraulic there must be a chemical change which may be produced by mixing of the lime and water with silica in an active form, or with a silicate containing silica in an active condition. Silicate of lime or pozzuolanic cement is one which is not widely used, it being employed mainly in districts where volcanic deposits furnish tufa, trass, or pozzuolana itself. Pozzuolanic cement has excellent qualities but it is not used extensively owing to its expensiveness.

Portland cement is not a mixture of active silica and lime ready to unite under suitable conditions; it is a definite chemical compound of lime and silica, and lime and alumina, which combines with water forming a crystalline substance of great mechanical strength. This crystalline substance is capable of adhering firmly to clean sand and crushed stone. Portland cements are formed by heating chalk, clay, limestone, marl, shale, slag, and similar materials to a high temperature. The correct proportions of lime, silica, and alumina must be maintained. The earliest form of Portland cement was hydraulic lime. This is still used to some extent and is prepared by burning limestone containing clay. The man to whom we may attribute the early perfection of the Portland method is Joseph Aspdin of Leeds, England, who added clay to finely ground limestone, thus calcining the mixture, and grinding the product together. Portland cement derived its name from the fact that it resembles Portland (England) stone, when set.

We have thus found that the chemical elements necessary in the manufacture of cement are lime, silica, and alumina. The silica and alumina are supplied by some form of clay or shale.

MANUFACTURE OF PORTLAND CEMENT.

The old method of making Portland cement is typified by the plants along the Thames in England. The materials used are chalk and

medway mud, a kind of clay. These substances are mixed in the proportion of three of chalk to one of clay (by weight), the dry mixture containing about 75 per cent of calcium carbonate and 25 per cent of clay. The raw materials are mixed with water in a wash mill and the resulting slurry is wet enough to flow. This slurry is now

FIG. 1. THE ROTARY KILN CONSISTS OF A LONG SHELL MOUNTED ON ROLLERS AND SO ARRANGED THAT THE PROCESS IS CONTINUOUS; THAT IS, THE RAW MATERIAL IS FED IN AT ONE END AND TAKEN OUT FROM THE OTHER IN THE FORM OF CLINKER READY FOR THE GRINDER.

ground between millstones and the process of comminution is completed. The grinding must be thoro, if the cement turned out is to be of good quality.

The slurry is now dried, usually by the waste heat from the kilns. In drying, it cracks into rough blocks suitable for loading into the kiln. Upon the grate of the kiln is placed a layer of coke and wood; a layer of the dry slurry is loaded upon this, then another layer of coke, then another layer of slurry and so on, until the kiln is filled with coke and slurry, evenly distributed. An ordinary kiln of this kind contains about fifty tons of slurry and twelve tons of coke. It usually takes about two days to get the kiln burning and two or three more for it to burn out, the entire run requiring about a week, allowing time for loading and unloading. The output resulting will be about thirty tons of *clinker* to be ground into cement.

But this method of manufacturing Portland cement is today almost obsolete. It is too slow and too expensive. As far back as 1890 one of our large cement companies began to develop the modern rotary kiln system. One of these kilns will produce from 500 to 3,000 barrels of cement per day while the old stationary or dome kiln could seldom exceed 100 barrels. That the United States produces today more cement than both England and Germany combined and that American

cements are acknowledged to be the best in the market, is due largely to the perfection of the rotary kiln in this country.

In order to understand fully the new method of manufacture we may well examine a typical Pennsylvania plant. In this state there are to be found large deposits of cement rock to which is added a small

FIG. 2. A TWO-TIRE ROTARY KILN.

percentage of lime. The resulting mixture of raw material is then reduced to powder, after which it is burned in a rotary kiln to cement clinker. The kiln consists of a steel cylinder, from 6 to 12 feet in diameter and from 60 to 250 feet in length, which is mounted at a slight inclination and is operated by a large driving gear which causes it to rotate longitudinally. See Figs. 1, 2, 3. The pulverized raw material enters this tube at the elevated end and by means of gravity, aided by the turning of the cylinder, it gradually works its way to the lower end. All the while the temperature within the tube is high enough to cause ignition as pulverized coal is injected by means of an air blast. Perfect calcination results and the clinker discharged at the lower end of the cylinder becomes the Portland cement of commerce.

The process of grinding cement clinker, the rough yet chemically perfect product of the kiln, has ever been a serious obstacle to the manufacturer as upon the fineness of the resulting powder depends the excellence of the cement, other things being equal. To reduce the clinker to the finest possible grade is the one great aim of the manufacturer. In times past millstones were used. But today the grinding is accomplished for the most part by ball mills. We again find the gravity principle employed in the action of the ball mill. Briefly, it consists of a rotating drum containing a large number of balls or

spheres of hardened steel. As the drum is rotated upon a horizontal axis the clinker is introduced and is thus ground to a floury powder by the constant roll and fall of the balls.

The above description is typical of the prevailing method of cement manufacture. But in many localities cement rock is not found as in

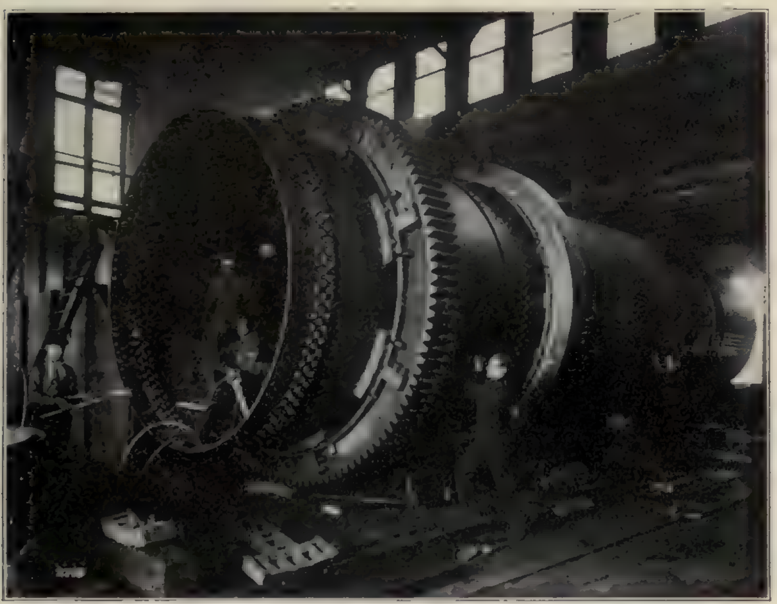

FIG. 3. SECTION OF KILN SHELL SHOWING GEAR AND RIDING RING.

Pennsylvania. Oftentimes the rough material at hand is far less pure in character. Frequently marl or river mud is still resorted to as we have learned was the case along the Thames in England even centuries ago. This mud has to be dried and washed before it can enter the rotary kiln. See Fig. 4.

Mr. Spackman, before referred to as an authority upon cement materials, has classified the sources of cement materials in this country somewhat as follows:[1] (The materials are arranged in the order of their importance.)

1. Argillaceous limestone, resembling slate. Eastern Pennsylvania and New Jersey.

[1]See article entitled "Manufacture of Cement from Marl and Clay," *Scientific American*, June 20, 1903.

2. Limestone and Clay. New York, Ohio, Illinois, Indiana, Missouri.

3. Marl, river mud found in low lands, marshes and at the bottom of lakes. Of putty consistency. Decomposed shells, etc. Michigan and Ohio.

4. Slag. 1. Mechanical mixture of slag with hydrated lime. 2. Slag treated as a low grade limestone to which sufficient lime is added to secure a correct analysis. Not restricted to any locality.

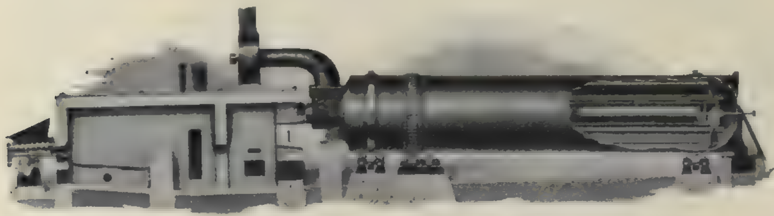

FIG. 4. THE MANITOWOC DRYER.

THE AGGREGATE.

Having found out that concrete is a mixture of cement, sand, and grit mixed with water, and having investigated the matrix, which we have learned is usually Portland cement, we will proceed to study the aggregate.

Portland cement as used in industry is today a thoroly standardized article. It must pass a strict examination as to composition, fineness, strength, soundness, etc. But sand has not been so standardized. Very often contractors have used most any kind of coarse earth for sand. We can hardly blame them when their contracts have specified that the sand must be "clean and sharp". Usually the specification as to the sand to be used stops right here. The point is discussed in Taylor & Thompson's treatise on "Concrete, Plain and Reinforced" as follows: "The experience of one of the authors during the past few years in the investigation of failures of concrete structures leads to the conclusion that unless the sand is from a bank of known quality it is even more necessary to test the sand than to test the cement." The essential requirements for sand which is to be used in concrete construction is as follows:

1. The sand should be free from vegetable matter such as loam. A very little of this may prevent the mixture from hardening properly.

2. The sand should be coarse. If a sand is so fine that 10 per cent passes a sieve having 100 meshes to the linear inch, or if more than

35 per cent passes a sieve having 50 meshes to a linear inch, it should be rejected. Fine sand requires nearly double the amount of cement in order to give a mortar having the same strength as that obtained from coarse sand.

The above requirements for sand are taken from an article by E. W. Lazell entitled "Elementary Studies of Cement". Dr. Lazell states that the presence of dirt, loam, or other fine foreign material can best be determined in the following manner: Fill a quart fruit jar to the depth of about 4 inches with the sand to be examined, and then add water until the jar is filled to within 1 inch of the top. Screw the cap on the jar and shake well a number of minutes. After shaking, the contents of the jar should be allowed to settle for a couple of hours. The sand will sink to the bottom, and the mud and fine material will form a distinct layer on top of the sand which is easily recognized by its color. If this layer of fine material or mud is more than $\frac{1}{2}$ inch thick the sand is not fit to be used.

It is possible to wash poor sand by placing a layer of the material to be washed upon an inclined screen and spraying it, beginning at the top with a garden hose. The sieve must be of a mesh sufficient to retain the sand required.

The following test for sand was recommended by the joint committee on Concrete and Reinforced Concrete for 1909: Mortars composed of one part Portland cement and three parts fine aggregate, by weight, when made into briquettes, Fig. 5, should show a tensile strength of at least 70 per cent of the strength of one-to-three mortars of the same consistency made with the same cement and standard Ottawa sand. To avoid removing any coatings of the grains which may affect the strength, bank sand should not be dried before being made into mortar, but should contain natural moisture. The percentage of moisture may be determined upon a separate sample for the correcting of weight. From 10 to 40 per cent more water may be required in mixing bank or artificial sands than for standard Ottawa sands to obtain the same consistency.

Besides sand, concrete should contain a certain amount of coarse aggregate consisting of inert material such as the crushed stone or gravel which would be retained by a screen having $\frac{1}{4}''$ holes. The material, of course, must be clean, hard, and free from impurities. A gradation of sizes of the particles is desirable, but flat or elongated pieces should be excluded if the concrete it to bear a great strain.

Where a large amount of concrete is to be used in mass the particles of coarse aggregate may be of a size sufficient to pass thru a 3″ ring.

All water used should be free from strong alkalies, acid, oil, or vegetable matter.

Since the San Francisco fire a great deal of emphasis has been placed upon the reinforcing of concrete structures. When the pressure is direct, concrete will bear an extremely heavy load. The writer saw 12,340 pounds pressure placed upon a 2″ cube before it was crushed. This cube was composed of one part Portland cement to three parts sand, 9 per cent of water being used. The mixture was made December 16, 1911 and crushed January 31, 1912. A briquette like that shown in Fig. 5, of similar composition, under the same conditions gave way at 260 pounds tensile stress. From the test given above it will be seen that where pressure is not direct some kind of reinforcement is necessary.

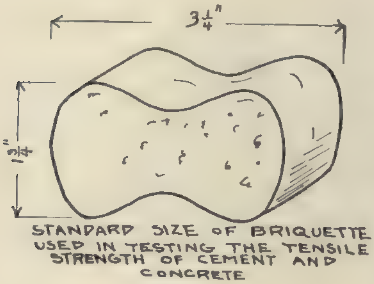

FIG. 5.

Steel is commonly used for such purposes. Small rods or even steel wire is often used in small work, while for great strains large rails and girders are used. All metal used must be free from scale or rust or any coating which would impair the strength of the bond. There must be a complete bond about the steel if the concrete is to take hold as it should. Because of this fact no particles of aggregate should be used, even in coarse work, larger than 1 inch in diameter if the concrete be reinforced.

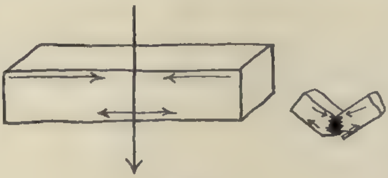

FIG. 6.

Fig. 6 is a diagram which is intended to show that the reinforcing material should be placed at the bottom of lintels, etc., as near the under side will come the greatest strain.

PROPORTIONS OF CONSTITUENTS.

The proportion of constituents will now be conisdered. From the facts already discussed, the two statements following are at once

evident: That concrete is strongest which, for the same weight of cement and the same total weight of aggregate gives the smallest volume. (This statement deals with density.) That concrete is strongest which, for the same total amount of aggregate contains the greatest amount of cement. (As pure cement is stronger than a combination of other materials and cement, the truth of this statement is also evident.)

In mixing concrete, the relation of the fine and coarse aggregate must be considered. This may be accurately determined by experimenting, the object being to secure the greatest or maximum density. The proportion of fine and coarse aggregate is determined by finding the volume of the voids in the coarse aggregate which must be filled by the fine. A jar is filled with coarse aggregate and then as much water is poured in as the jar will contain with the aggregate. The water is then poured off and measured. It will be the same as the volume of fine aggregate required.

If a maximum density is required, the voids in the sand which are to be filled by cement may be determined in a similar way. In this case the sand is first dried and is placed in the jar again, the height to which it reaches being marked. Once more water is poured into the jar until it reaches to the place marked. The water is now allowed to drain off the sand leaving it perfectly dry. The volume of the water draining off will represent the volume of cement to be used.

The proportions of ingredients in concrete vary according to the purposes for which it is being prepared. The determining factors of proportion are: required strength, density, and economy. The four mixtures which are most commonly used are: rich (cement 1, sand 1½, coarse aggregate 3); standard (cement 1, sand 2, coarse aggregate 4); medium (cement 1, sand 2½, coarse aggregate 5); and lean (cement 1, sand 3, coarse aggregate 6). In watertight utensils and in places where there are high stresses a rich mixture is used. The standard mixture is employed for machinery foundations, floors, etc. Retaining walls, sidewalks, and similar structures demand a medium mixture, while heavy walls, stationery loads, and similar structures require a lean mixture.

The proportion of water is an important element. There are three consistencies in general use, i. e., wet, medium, and dry. It is evident that work requiring thin sections or fine detail must be done with a wet mixture, which will flow easily into all parts of the mold. A

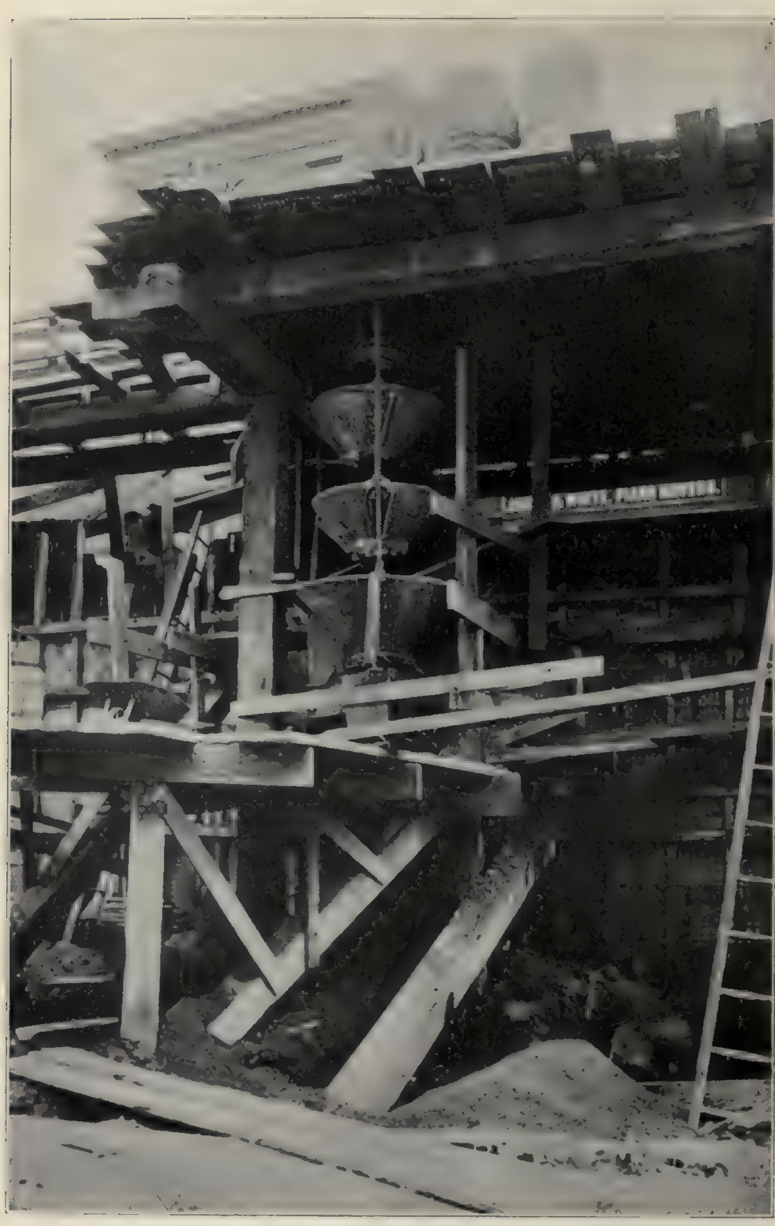

FIG. 7. AUTOMATIC CONCRETE MIXER.

medium mixture, however, sets stronger and should be used in most cases. This mixture is tamped in order to prevent the formation of air holes known as pockets. Some foundation work and concrete pottery of certain kinds require a dry mixture.

MIXING CONCRETE.

Upon large jobs concrete is today mixed by machinery. Sometimes, however, no power is needed, a system depending entirely upon gravity being employed.

Fig. 7, furnished by J. J. Shaughnessy, vice president of the Automatic Concrete Mixer Company of New York City, shows one of these mixers in operation. See also Fig. 8. Mr. Shaughnessy describes the mixer as follows:

> The automatic mixer is just what its name indicates, no power being required, and yet the aggregates are mixed in a way to meet the most exacting requirements. Briefly, this mixer consists of four hoppers placed one directly above another. The top hopper is filled with layers of gravel, cement and sand in proper proportion. The water is added, then the mix is discharged from one hopper to another. Gravity does the rest. The mixing is due to the hour glass principle, because each time the mix is discharged it does not slide along the sides of the hopper but falls inward at the center as do the sands of an hour glass. In a word, the charge pulls itself inside out, and is rotated in its fullest sense.

All mixing for small work is usually done by hand. The tools used are the spade, hoe, and sometimes a rake. The mixing is done on a platform which keeps the mix clean. A layer of sand is spread upon one end of the platform and a layer of cement (the desired amount) is spread over this. The mixer now turns over the entire material, a shovelfull at a time, each shovel containing both sand and cement. The material is turned over twice in this way. The mixer is careful each time to allow the material to run off the edge of his spade, thus aiding the mixing process. The coarse aggregate, which has been previously wetted is now spread over the dry mixture of cement and sand, and water is poured over all. The concrete mixture is now "turned" three times in the way described above, or until all has been thoroly mixed.

Concrete is usually shaped by means of molds called forms, consisting of an outside one and an inside one sometimes known as a core. The function performed upon the concrete by these forms is similar to that performed upon molten metal by the space left in the sand after

the pattern has been removed and the core inserted. Indeed, for certain kinds of ornamental work, sand forms are sometimes used in the concrete industry.

Molds made from glue or gelatine are often used for the casting of intricate pieces of statuary. The concrete used is thin enough to flow into all the small crevices of the form, and the gelatine is plastic enough to allow the mold to be pulled off after the material has set. Mr. Davison's book on "Concrete Pottery and Garden Furniture" explains this process fully. Plaster of Paris molds are used extensively for small work involving simple shapes.

FIG. 8. AUTOMATIC CONCRETE MIXER BEING USED IN HOUSE BUILDING.

Where the forms are to be used over and over again metal is usually employed. Galvanized iron is popular for this service because it will not rust. Steel is also used. Forms for making concrete bricks, fence posts, etc., are usually made of metal.

But the material most widely used in the making of forms is wood. Wood of a suitable quality is comparatively inexpensive, and it has the advantage of being easily worked. The wood used must be of a nature which will not warp nor change to any marked degree under the influence of water; green lumber is preferred for certain kinds of work. When set up, these forms must be firm enough to allow no expansion from the weight of the material.

Fig. 9 shows the method used in making a form for a cellar wall. This form was used by the writer in building a wall in his home.

Concrete should not be made or used in freezing weather unless care is taken not to use any material containing frost crystals. After placing, too, the concrete must be protected from frost by lining the forms with tarred paper; sometimes, by means of steam pipes passed around the forms.

Care must be taken that no exposed electric wires be near a concrete structure which has been reinforced with iron or steel, as electrolysis which takes place will cause the metal to deteriorate.

FIREPROOFING AND WATERPROOFING.

Tests have been made which show that concrete may be used for purposes of fireproofing. Clean, hard burned cinders serve well as the coarse aggregate for fireproofiing purposes. We may attribute the fireproofness of concrete largely to its low rate of heat conductivity. Sharp corners are always avoided in fireproof construction, as corners are affected more seriously by fire.

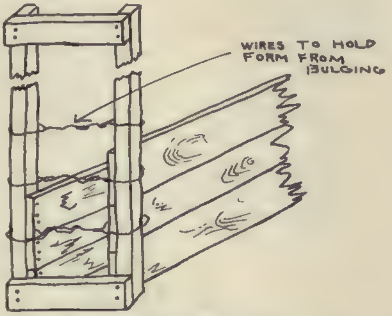

FIG. 9. METHOD OF PREPARING FORM FOR CONCRETE WALL.

When mixed to the maximum density, concrete is waterproof enough for practical purposes. But we know that the greatest possible density is seldom, if ever, reached. A dry mixture of concrete is far from waterproof. Compounds of various kinds have thus been prepared which may be mixed with concrete to render it waterproof; other preparations have been contrived which are applied externally as a sort of paint. Altho hydraulic in character, concrete will decompose when submitted to the action of sea water. It has not yet been determined what there is in sea water to bring about this decomposition. But there are today preparations on the market which render it impervious even to sea water. These external preparations are applied with a brush or, sometimes, with a cement gun. Plastering should be avoided. Even if carefully applied, plaster is likely to peel off under the action of temperature changes.

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Lock Joint Pipe Co., New York, N. Y.

D. & A. Post Mould Co., Three Rivers, Mich.

The Aquabar Co., Philadelphia, Pa.

Charles Warner Co., Wilmington, Del.

Simpson Cement Mould Co., Columbus, Ohio.

Leizer Brothers, Berwick, Pa.

F. S. Converse, Binghampton, N. Y.

C. Eilbacher, Elizabeth, N. J.

The Atlas Portland Cement Co., New York, N. Y.

Blaw Collapsible Steel Centering Co., Pittsburgh, Pa.

Chain Belt Co., Milwaukee, Wis.

The Cockburn Co., New York, N. Y.

Abbe Engineering Co., New York, N. Y.

Integral Waterproofing Co., New York, N. Y.

The Duetsch System of Concrete Construction, New Haven, Conn.

Raber & Lang Mfg. Co., Kendalville, Ind.

The Edison Portland Cement Co., New Village, N. J.

Manitowoc Engineering Works, Manitowoc, Wis.

FARM MECHANICS.

L. M. Roehl.

THERE are no two schools offering work in farm mechanics which give the same amount of time to any one branch of the subject; so an outline for any one school could not be used in any other without being greatly changed. One school may give five ninety-minute periods a week for one-half year to carpentry; another may give only two such periods a week for twelve weeks. Some agricultural schools are three-year courses, some two, and the agricultural high schools vary in the amount of time given to agriculture and farm mechanics. This makes it impossible to write an outline which can be used by all of these schools. The best that can be done is to outline a rather extensive list of problems and from this outline each instructor may be able to select problems suitable to his particular school.

A knowledge of farm mechanics is a farmer's equipment wherewith to plan and build his farmstead; to plan well each individual building; to build, equip, and know how to use a workshop; to purchase, use, and keep in good condition farm power and field machinery; to equip the farm with farm conveniences such as water supply, sewage disposal, and lighting system.

That a course in farm mechanics can be made practical thruout and free from theory is being proven, and because of its practicability and lack of theory it engages the attention of all students interested in agricultural work. Such a course is necessarily different from any that is offered in schools other than agricultural schools, because the students pursuing it have already chosen their vocation and desire work to meet their needs as farmers. The test question in this course is not "Can you explain or tell about a certain problem?" It is, "Can you construct the problem?" It is not, "Can you tell how to splice a rope?" It is, "Can you splice it?" The hands must be able to execute the mechanical work which the mind thinks to be of most use to an individual.

The course includes Drawing, Carpentry, Blacksmithing, Concrete Construction, Special Practical Shopwork, Gasoline Engines, Farm Machinery, Sewage Disposal and Lighting Systems.

The drawing and carpentry should be correlated as far as possible,

so that each student will have made a drawing of each problem in carpentry preceding its construction.

PLATES IN MECHANICAL DRAWING.

Exercise Sheets

a. Trim line, border line, division lines used in laying out sheets.
Rectangles with base horizontal, inclined at 30°, 45°, and 15°.
Practice in drawing lines parallel to horizontal, 30°, 45°, and 15° lines.
Practice in drawing lines perpendicular to horizontal, 30°, 45°, and 15° lines.

b. Practice in formation of freehand inclined Gothic letters.
Lower case, upper case, Arabic numerals, Roman numerals.

1. Lettering sheet.

Geometric Problems

2. Line notation for geometric drawing. I. To bisect a given angle. II. To construct an angle equal to a given angle. III. To divide a given line into any number of equal parts.
3. IV. To inscribe an equilateral triangle in a given circle. V. To inscribe a square in a given circle. VI. To inscribe a regular pentagon in a given circle. VII. To inscribe a regular hexagon in a given circle.
4. VIII. To inscribe a regular polygon of any number of sides in a given circle. IX. To construct an approximate ellipse with circular arcs, axes being given. X. To draw a spiral of given pitch with four centers. XI. To draw a straight line equal in length to a given arc less than a semicircumference.

Isometric Projection

5. Isometric axes. I. Isometric drawing of a cubical box without cover. II. Isometric drawing of flaring water trough. III. Isometric drawing of drain tile.
6. IV. Butt joint. V. Gained butt joint. VI. Half-lap joint. VII. Mortise-and-tenon joint.
7. VIII. Drawing table with drawing board and T-square ready for use.

Cabinet Projection

8. Cabinet axes. I. Cabinet projection of concrete horse block with initials. II. Cabinet projection of blacksmith's hardie. III. Cabinet projection of a round porch column on square base.
9. IV. Oblique butt joint. V. Oblique thrust joint. VI. Housed brace joint. VII. Oblique mortise-and-tenon joint.
10. VIII. Workbench.

Orthographic Projection

11. Orthographic axes. I. Orthographic projection of bushel box. II. Orthographic projection of chain link. III. Orthographic projection of 3 piece elbow.

Working Drawings

12. Miter-box.
13. Saw-horse.
14. Tool-box.
15. Workbench.
16. Wagon box.
17. Hay rack.
18. Stock rack.
19. Culvert.
20. Septic tank.
21. Details of machine bolt. Strap or fishplate.
22. Details of wrought iron angle brace. Wrought iron shoe truss strut.
23. Galvanized iron ventilator hood with section.
24. Freehand drawing of knots 1, 2, 3, 4.

Transmission Machinery

25. Elevations and plan of transmission machinery installation.
26. Details for preceding plate.

Topographical Drawing

Architectural Drawing

28. Cabinet projection of sills on wall—heavy timber sill, box sill (a) box sill (b) 2″ plank barn sill without header.
29. Sectional elevation of 2″ plank barn sill without header showing joist, stud, floor, sheathing.
30. Sectional elevation of box sill showing sill, joist, stud, rough floor, grounds, lath, plaster, finish floor, base board, floor shoe, sheathing, building paper, water table, drip cap, lap siding.
31. Window frame for double-hung window, elevation, longitudinal and transverse sections.
32. Floor plan of chicken house.
33. Sectional elevation of chicken house.
34. Front elevation of chicken house.
35. End elevation of chicken house.
36. Floor plan of two inch plank frame barn with silo.
37. Sectional elevation of plank frame barn with concrete stable floor and barn bent.
38. Sectional elevation of plank frame barn showing bent framing.
39. Sectional elevation of plank frame barn showing side framing.
40. Side elevation of plank frame barn with silo.
41. End elevation of plank frame barn with silo.
42. First floor plan of house.
43. Cellar floor plan of house.
44. Second story plan of house.
45. Front elevation.
46. Right side elevation.
47. Left side elevation.
48. Rear elevation.
49. Detail plate of interior trim.

CARPENTRY.

First the student should acquaint himself with the following carpentry tool operations:

1. Rip-sawing.
2. Crosscut-sawing.
3. Leveling.
4. Plumbing.
5. Erecting.
6. Tool sharpening:
   a. Saw filing,
   b. Grinding,
   c. Whetting.
7. Measuring.
8. Drawing lines at angles.
9. Planing:
   a. Broad surface,
   b. Edge,
   c. End.
10. Laying out and cutting chamfer.
11. Laying out and cutting bevel.
12. Boring.
13. Doweling.
14. Mitering.
15. Chiseling:
    a. With grain,
    b. Across grain.
16. Nailing.
17. Screw driving.
18. Countersinking.
19. Tapering.
20. Scraping.
21. Sanding.
22. Gluing.
23. Round surface edging.
24. Mortising.
25. Wood filing.
26. Matching.
27. Paneling.

Following is a list of joints used in carpentry and a number of useful farm articles which may be used as means toward mastering the tool operations.

1. Single tree.
2. Evener.
3. Members of wagon gear.
4. Wagon jack.
5. Wagon box.
6. Hay rack.
7. Stock rack.
8. Gate.
9. Step ladder.
10. Silo form.

1. Butt joint.
2. Gained butt joint.
3. Half-lap joint.
4. Mortise-and-tenon joint.
5. Oblique butt joint.
6. Oblique thrust joint.
7. Housed brace joint.
8. Oblique mortise-and-tenon joint.

After the tool operations have been mastered by use of the joints and useful articles the regular carpentry projects should be taken up. As many of those as possible should be built full scale. As indicated by the accompanying illustrations this can be done by building a typical corner, cornice, door, window, wall, porch, barn bent, dormer, etc. By this method the problem is complete. If more were added a repetition would result, more lumber and space would be used, and nothing

new learned. By building the problem smaller it would not be complete. By building projects full scale the students have exactly the same problem which they would have in actual practice. The following problems can be studied to best advantage by building $\frac{1}{4}$ scale.

FIG. 1. INTERIOR VIEW SILL, WALL, AND FLOOR CONSTRUCTION OF HOUSE.

CLASS PROBLEMS $\frac{1}{4}$ SCALE.

1. Chicken house.
2. Plank frame barn.
3. Wood shed.
4. Silo form.
5. Timber frame barn.
6. Farm shop.

GROUP PROBLEMS—FULL SCALE.

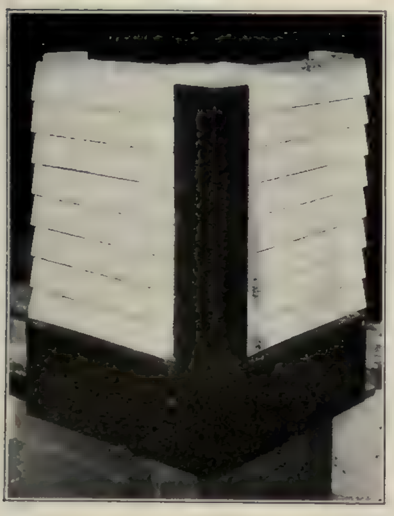


FIG. 2. EXTERIOR VIEW, SILL, WALL, AND FLOOR CONSTRUCTION OF HOUSE.

1. Sill, wall, and floor construction for house (studding resting on rough flooring), Figs. 1 and 2.
2. Sill, wall, and floor construction for house (studding resting on wall member of box sill), Fig. 3.
3. Sill, floor, wall, window, and door construction for house, Fig. 4.
4. Wall and window construction, wall 5′ 0″ high, 4′ 9″ wide, with double-hung window, with two panes 12″x12″, Fig. 5.
5. Box cornice construction, corner of hip roof ½ pitch, Figs. 6 and 7.
6. Common cornice construction, corner of high hip roof ⅜ pitch.
7. Porch construction, corner of porch, Figs. 8, 9, and 10.
8. Open stair.

BLACKSMITHING.

In the blacksmith classes the students are taught as far as possible to be their own repairmen and to be able to perform the operations ordinarily met with. The mastering of the operations is the primary aim and the making of the exercises or articles is only a means toward this end and is only of secondary importance. The students are taught that the machinery on a farm should always be in good condition to do good work and in order that it be kept so it has to be repaired by a blacksmith or by themselves. To be able to repair it themselves has the advantage of a saving of time and expense. There are at least twenty-eight operations to be learned, and the thirty-nine exercises or projects give practice in all of them. The exercises are such as the students will come in contact with on the farm.

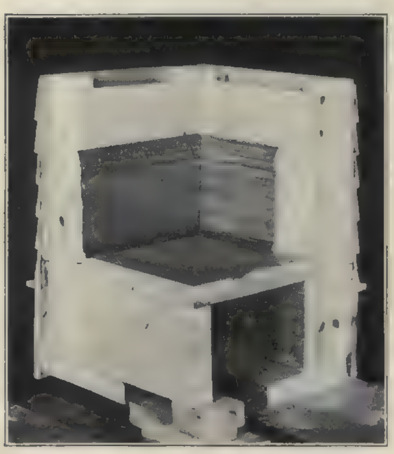


FIG. 3. SILL, WALL AND FLOOR CONSTRUCTION FOR HOUSE.

OPERATIONS.

1. Measuring.
2. Squaring round stock.
3. Rounding square stock.
4. Drawing out.
5. Upsetting.
6. Tapering.
7. Bending.
8. Shaping.
9. Scarfing.
10. Cutting cold stock.
11. Cutting hot stock.
12. Punching.
13. Reducing.
14. Twisting.
15. Welding:
    a. Scarf or lap weld,
    b. Fagot weld,
    c. T-weld with round iron,
    d. T-weld with flat iron.
16. Smoothing with flatter.
17. Fullering.
18. Swaging.
19. Hack-sawing.
20. Tempering.
21. Grinding.
22. Drilling.
23. Filing.
24. Riveting.
25. Threading.
26. Tapping.
27. Brazing.
28. Annealing.

PROJECTS.

1. Squaring round stock.
2. Rounding square stock.
3. Ring.
4. Hook.
5. Eye spike.
6. Staple.
7. Gate hook.
8. Cold shut.
9. Gate hinge.
10. Door hasp.
11. Small chain hook.
12. Large chain hook.
13. Links.
14. Chain trace.
15. Grab hook.
16. Straight clevis.
17. Twisted clevis.
18. Bolt.
19. Singletree end hook.
20. Singletree ferrule.
21. Wire stretcher.
22. Ring and eye bolts for neckyoke.
23. Round stock end weld.
24. Round stock T-weld.
25. Flat end weld.
26. Flat T-weld.
27. Nailset.
28. Staple puller.
29. Center punch.
30. Small cold chisel.
31. Large cold chisel.
32. Small punch.
33. Large punch.
34. Screwdriver-bit.
35. Pinch bar.
36. Pick sharpening and tempering.
37. Cultivator tooth sharpening and tempering.
38. Plow sharpening and tempering.
39. Riveting two flat pieces of stock together.

SPECIAL PRACTICAL SHOP COURSE.

There is a large number of odd jobs on the farm some one of which needs to be done almost daily and the farmer who can do them himself can save the expense and time of having them done and thus dispose of a large number of inconveniences. The "Special Practical Shop Course" contains all the odd jobs which do not rightly belong in any of the other courses.

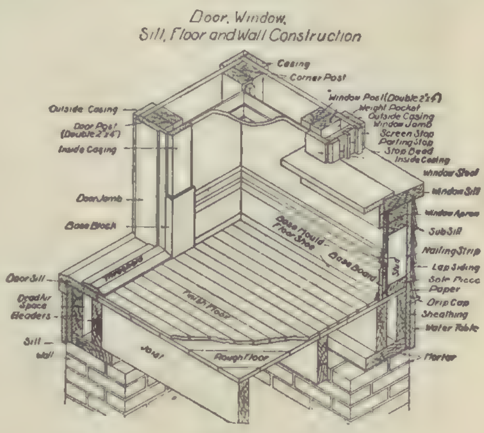


FIG. 4.

Rope Work

1. Knots:
   a. Granny,
   b. Manger,
   c. Bowline,
   d. Emergency.

FIG. 5. WALL AND WINDOW CONSTRUCTION, INTERIOR VIEW.

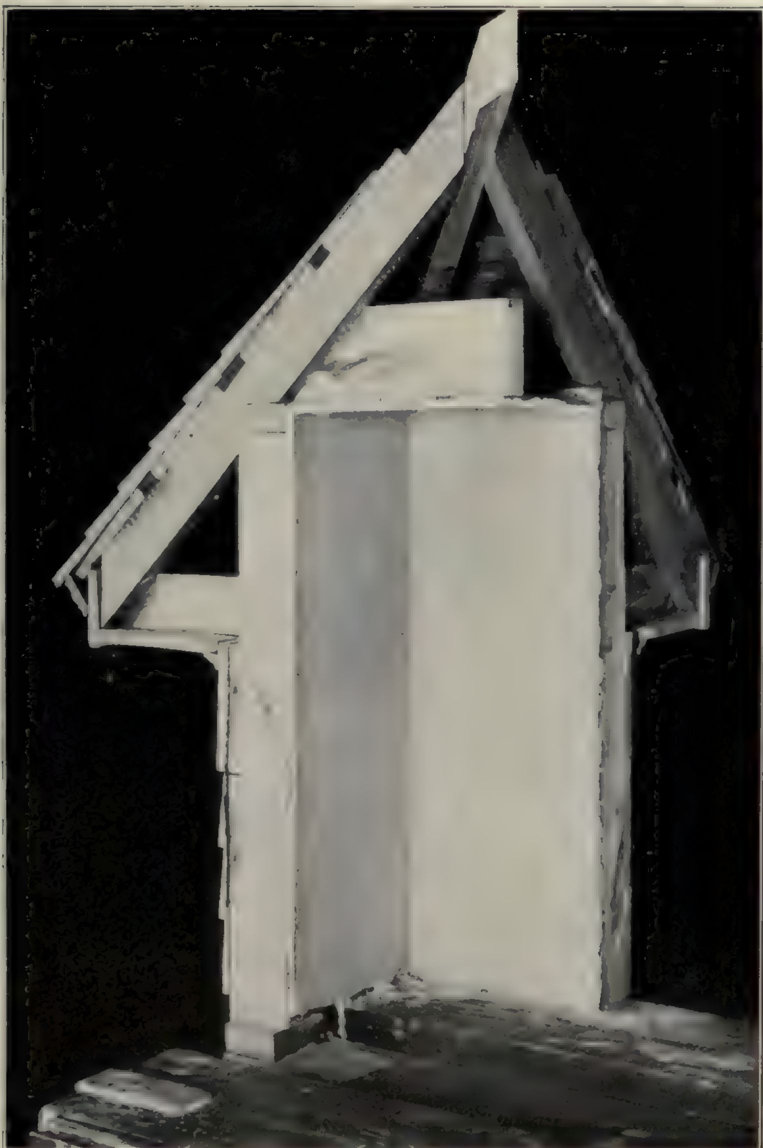


FIG 6. BOX CORNICE CONSTRUCTION, CORNER OF HIP ROOF, ½ PITCH.

2. Hitches:
   a. Timber hitch,
   b. Blackwall hitch,
   c. Sheep shank.
3. Splices:
   a. Eye,
   b. Crown and end,
   c. Short,
   d. Long.

Belting

1. Endless belts:
   a. Rubber,
   b. Leather.
2. Spliced belts:
   a. Lacing,
      rawhide, wire.
   b. Mechanical fasteners.

FIG. 7.

Tinsmithing

a. Soldering a hole.
b. Patching a hole.
c. Riveting a seam.
d. Soldering a seam.
e. Laying out pattern and cutting metal for three piece elbow.
f. Laying out pattern and cutting metal for chimney cap.

Pipe Work

a. Measuring.
b. Cutting.
c. Fitting.
d. Joining.

Babbetting

a. Box cleaning.
b. Box packing and shaft protecting.
c. Babbett melting and pouring.

Transmission Machinery

a. Shaft hanging:
   1. Ceiling.
   2. Bracket.
   3. Floor post.
b. Speed of pulleys:
   1. Given speed and diameter of driver and speed of driven to find diameter of driven.
   2. Given speed and diameter of driver and diameter of driven to find speed of driven.
   3. Given speed and diameter of driven and speed of driver to find diameter of driver.
   4. Given speed and diameter of driven and diameter of driver to find speed of driver.

CONCRETE CONSTRUCTION.

Concrete is being used more and more extensively in the country and it is well that it should be as it is good economy for a farmer to use this permanent building material wherever possible.

It is better to construct problems in concrete on a large than on

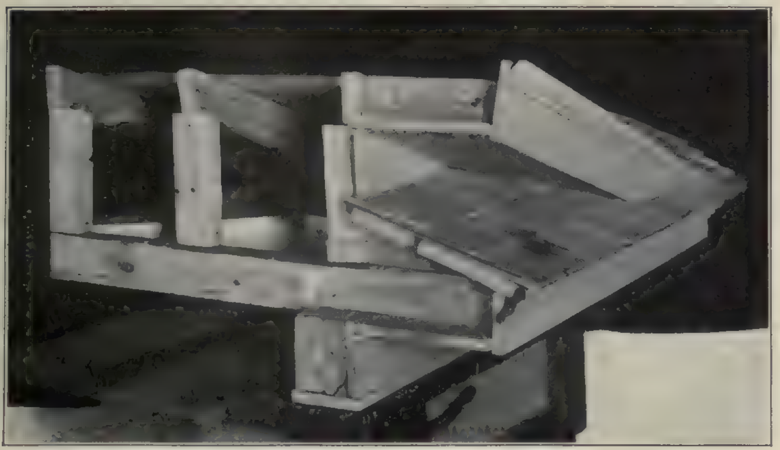


FIG. 8. PORCH CONSTRUCTION SHOWING EXTERIOR FINISHING.

a small scale. This tends to make the problems like the actual work which students will do later. If possible a class should build a real culvert in a road or a cement walk which is to be used about the buildings or some other permanent project. This will teach how to meet all problems which arise by actually coming in contact with them.

OPERATIONS.

1. Measuring.
2. Proportioning.
3. Mixing.
4. Reinforcing.
5. Testing.
6. Form building.
7. Surface finishing.
8. Figuring cost.

PROBLEMS.

1. Small foundation wall.
2. Driveway approach.
3. Retaining wall.
4. Barn floor, including manger and gutter.
5. Engine base.
6. Sidewalk.
7. Straight culvert.
8. Arched culvert.
9. Water tank.
10. Water trough.
11. Silo.
12. Steps.
13. Septic tank.

GASOLINE ENGINES.

The gasoline engine has so many uses to which it may be put on the farm that it is good economy for most farmers to have one or more, the size of which is determined by each farmer's particular needs.

Students should familiarize themselves with the working principles

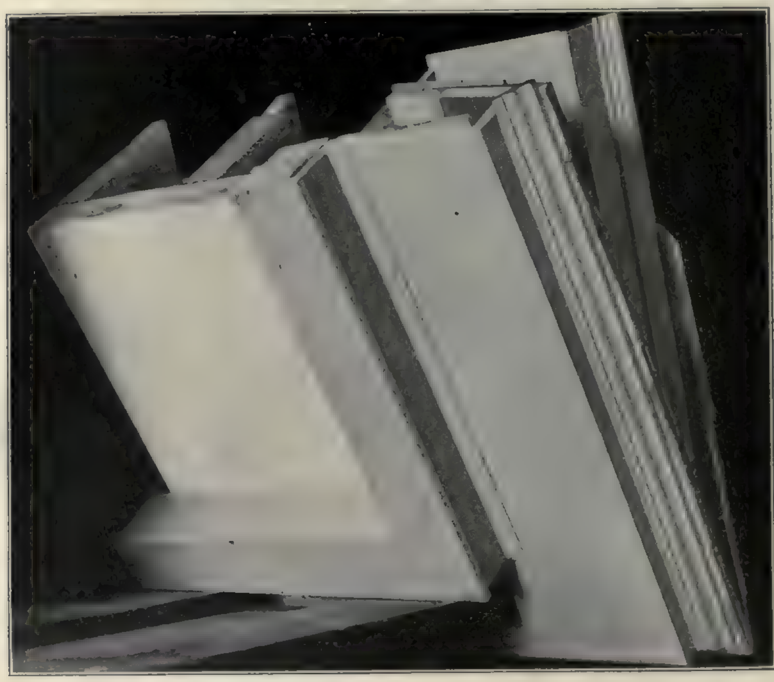


FIG. 9. PORCH CONSTRUCTION, SHOWING CEILING FINISHING.

of gasoline engines so well that they will be able to run any of the different makes. A good way to do this is to have students dissemble and assemble a machine and make a thoro study of all the parts. The particular feature which should be emphasized is engine troubles—how to detect and remedy them.

The following outline indicates the different parts of an engine which may be studied separately or as units of study.

Working principles of four cycle engine.

a. Suction stroke.
b. Compression stroke.
c. Expansion stroke.
d. Exhaust stroke.

Engine Cylinder

a. Piston head.
b. Piston rod.
c. Piston rings.
d. Gasket.

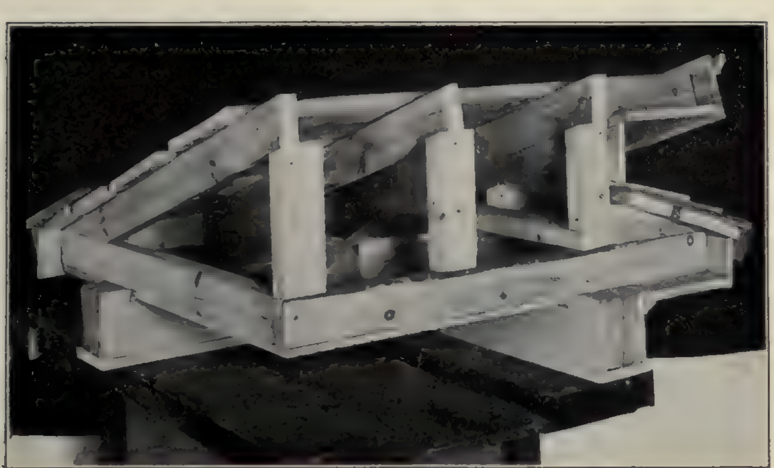


FIG. 10. PORCH CONSTRUCTION, SHOWING FRAMING.

Carbureter

a. Construction.
b. Regulation.
c. Work.

Ignition

a. Batteries.
b. Coil.
c. Spark plug.
d. Make and break ignitor.
e. Magneto.
f. Wiring.
g. Connections.
h. Timing.

Cooling system

a. Pump.
b. Valves.
c. Pipes and connections.
d. Syphon.

Valves

a. Intake.
b. Exhaust.
c. Springs.
d. Guides.

Cams

a. Cam.
b. Cam gear.
c. Cam lever.
d. Cam roller.

Lubrication

a. Oils.
b. Cup grease.
c. Oil cups.
d. Grease cups.

Governor and pulley

Gasoline pump

Starting troubles

a. Faulty ignition.
b. Too much or too little gasoline.
c. Water in cylinder.
d. Loss of compression.

Ignition troubles

a. Exhausted batteries.
b. Loose wires.
c. Short circuit.
d. Dirty ignition points.
e. Improper timing—spark at wrong time.

Running troubles

a. Water cooling system checked causing overheated cylinder.
b. Overload.
c. Leaky valves.
d. Loss of compression.
e. Closed inlet and exhaust passages.

Care of Engine

a. Cleaning.
b. Testing parts.
c. Oiling.

ROOMS IN PAPER.

PROBLEMS IN CONSTRUCTION AND DESIGN.[1]
VII.

NAMA A. LATHE AND ESTHER SZOLD.

THE BED-ROOM.

THE bed-room is the most intimate room in the home. Its furnishings, perhaps more than those of any other room, vary according to the personality of its occupants. Probably it is the one room in the home where the child may do some experimental work in decorating to suit his own taste.

Altho the articles of furniture chosen vary to suit personalities and domestic arrangements, a well-furnished bed-room must suggest rest, quiet, and airiness. Places for storing one's clothing demand drawer space. If, as is usually the case, the bed-room is also the dressing-room a mirror in a well-lighted place is a necessity. A writing desk where one may withdraw from the family for personal correspondence may be desirable. In the bed-room shown it is supposed that closet space is ample and that a lavatory is provided in the bathroom.

We suggest twin beds for sanitary reasons and it fits the exigencies of the case admirably for it is a better form for paper construction than a double bed, and the work of two pupils shows in the finished room.

The first piece of furniture to be made may be the straight chair. Instructions for this have been given in detail.[2] If it is preferred to make more intricate chairs it will be well to begin by constructing the bed.

Follow this general order in drawing the patterns:

(1). Draw the base line.

(2). Erect the main vertical lines.

(3). Measure for an important horizontal line at, or near, the top of the drawing.

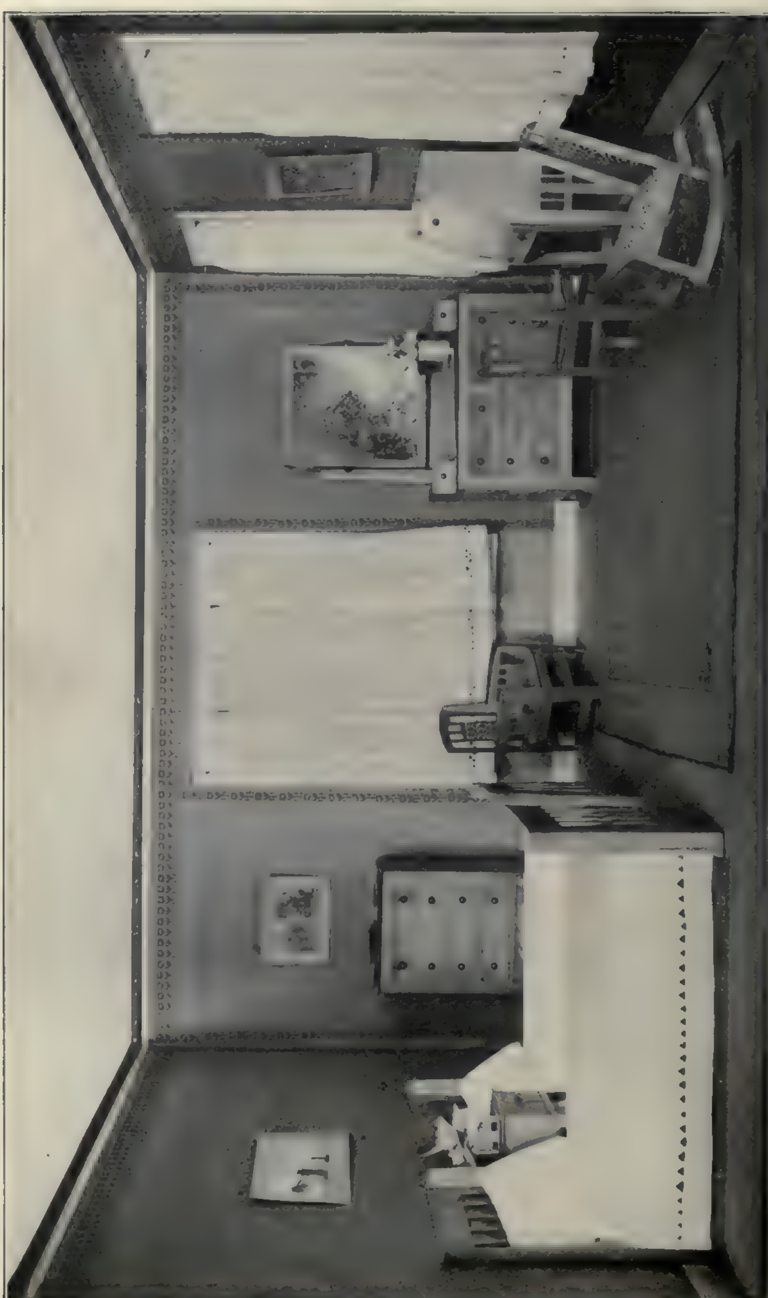
(4). Test the verticals by measuring the spaces between them at this height.

(5). Proceed from the main forms to the smaller divisions.

(6). Mark scoring and cutting lines.

(7). Score, cut, fold, and paste.

[2] See February, 1912, number, p. 214.



ROOMS IN PAPER—BED-ROOM.

THE BED.

See Fig. 37, Fig. 37A, and Fig. 37B.

Head and Foot:—In drawing the pattern for the head and foot of the bed note that the corners of the bed are at lines *A*. Lines *X* are pasting lines.

Design:—Making the pattern for the paneling of the head and foot offers opportunity for study of beautiful relations of spaces. One must remember that the corner uprights and the top and base rails need to be strong. The head and foot should be solid enough to prevent bedding from slipping thru.

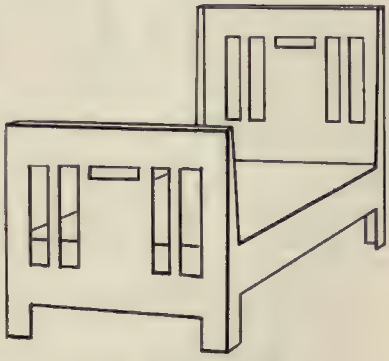


FIG. 37A. THE BED.

Body:—Draw the verticals marked "head" and "foot" and mark them so on the drawing. Complete the drawing, noting carefully the differences between the head and foot.

Order of Pasting. Body:—Paste the legs attached at the head of the body under the head rail as they fit when folded.

Note that the legs at the foot of the body are *not* pasted to the foot-rail of the body. This rail is held in place by pasting the 1″x½″ laps at the ends of the rail upon the places marked on the side rails. This leaves the corners of the legs ¼″ away from the foot-rail. See Fig. 37B.

Head and Foot:—Paste the small laps at the top of the side strips under the strip running across the top. See Fig. 37A and Fig. 37B.

Assembling:—If the parts have been correctly pasted each part should stand alone. The legs attached to the body fit inside the legs of the head and foot, strengthening them and making the construction more rigid.

Be sure that the foot board comes at the end of the body where the legs project beyond the rail.

Stand the pieces in order, note points of contact and glue in place.

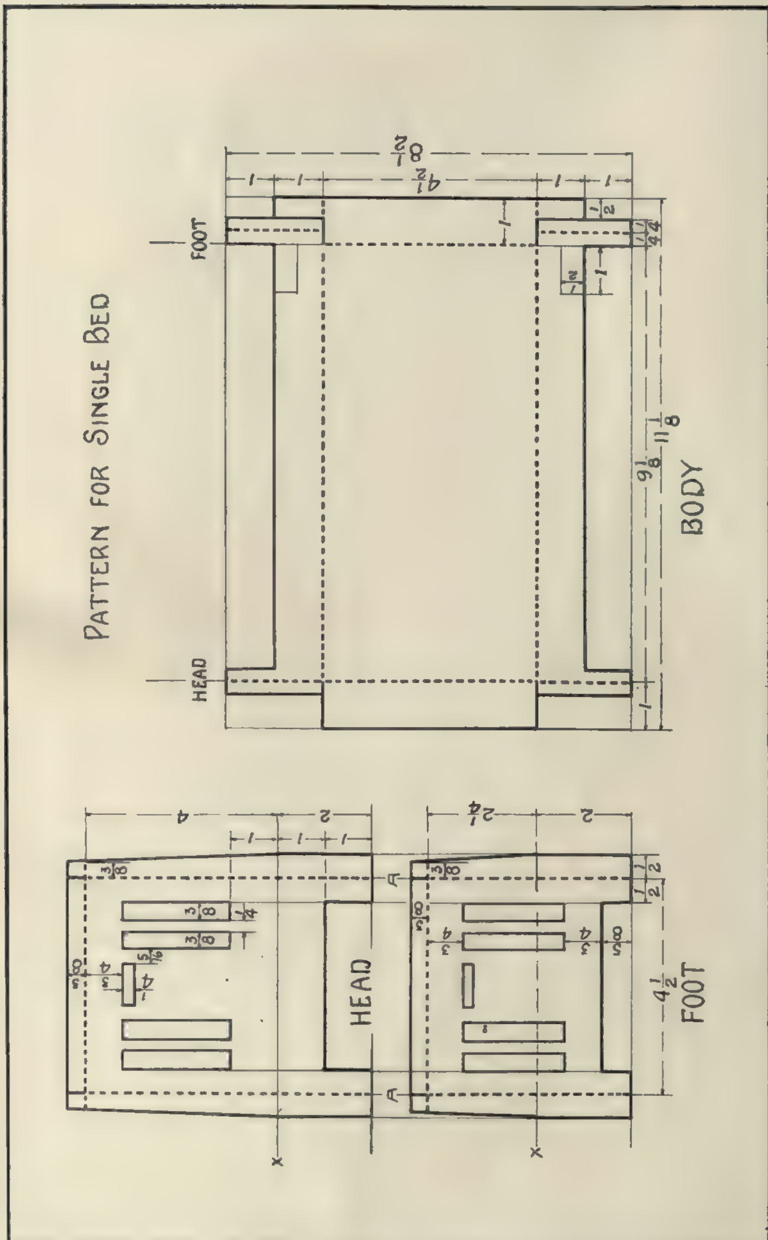


FIG. 37. THE BED.

Bedding:—The mattress is made of cotton laid upon a stiff paper frame the size of the top of the body. The cotton is covered and held in place by white tissue paper spread over the whole and pasted under the stiff base.

Pillows are cotton and the slips are white tissue paper.

Fine Japanese crepe paper with its long folds running across the bed forms satisfactory spreads. Squares should be cut from both corners at the foot to make it fit about the legs neatly and slip between the "springs" and the foot of the bed.

FIG. 37B. BED SHOWING SPACE AT FOOT BETWEEN "SPRINGS" AND FOOTBOARD.

CHIFFONNIER, WITH APPLIED DRAWER FACES.

See Fig. 38 and Fig. 38A.

This form is given to show the simplest method of construction with the greatest possibilities for design. Proportions may be varied if the same relation of parts is kept.

When the height and width of the frame are determined draw the four sections.

Design:—Draw an oblong equal to the front upon a separate piece of the construction paper and arrange drawers or doors and the height of the legs as desired, with due regard to the width of rails necessary for strength, to the beauty of spacing and probable use of the different compartments.

True up with a ruler, and mark points for the drawer pulls accurately.

Cut out the oblong outlining the size of the front and place it exactly upon the drawing of the front in the pattern for the frame. Prick holes thru both papers at the points marked for the drawer pulls.

Placing Drawer Faces:—Draw, score, cut, and fold, but do not paste, the frame.

Cut out one drawer face. Push two pins thru the two holes in the drawer face so that the points project half an inch upon the marked side. Spread glue upon that side.

Put the points of the pins into the holes corresponding in the front of the frame. Press the face into place.

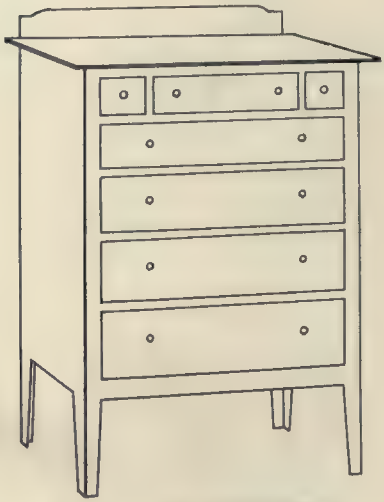


FIG. 38A. THE CHIFFONNIER.

Repeat with the other drawer faces, leaving those with only one pull until the last, then adjust them by sight and the one pin.

Order of Pasting:—The drawer faces are pasted in place first.

Back Section:—The extension above line *X* in the back section forms the projecting top of the chiffonnier and a protection rail across the back.

Fold the outer $\frac{1}{4}''$ laps back upon the inner $\frac{1}{4}''$ spaces. Glue in place.

Protecting Rail:—Fold the upper $\frac{3}{8}''$ space upon the $\frac{3}{8}''$ space immediately above line *X*. Glue together.

Front:—Paste the laps at the ends of the top under line *X* of the side sections.

Paste lap at the back of the top against the back section.

Fold the lap at the back of the side section over the back of the case. Glue in place.

Projecting Top:—Spread glue on the top of the frame. Lay the projecting top in place. Invert the chiffonnier and press until dry.

Strengthening the Legs:—Cut, score, fold, and glue inside the angle of each leg a strip of paper narrower than the leg.

Shaping the Protecting Rail:—To design the shape of the protection rail, cut a strip of paper the height and width of the rail; cut the top the shape desired. Place a ruler or a piece of dark paper covering the rail. Place the shaped strip in front of the dark paper. Vary it until

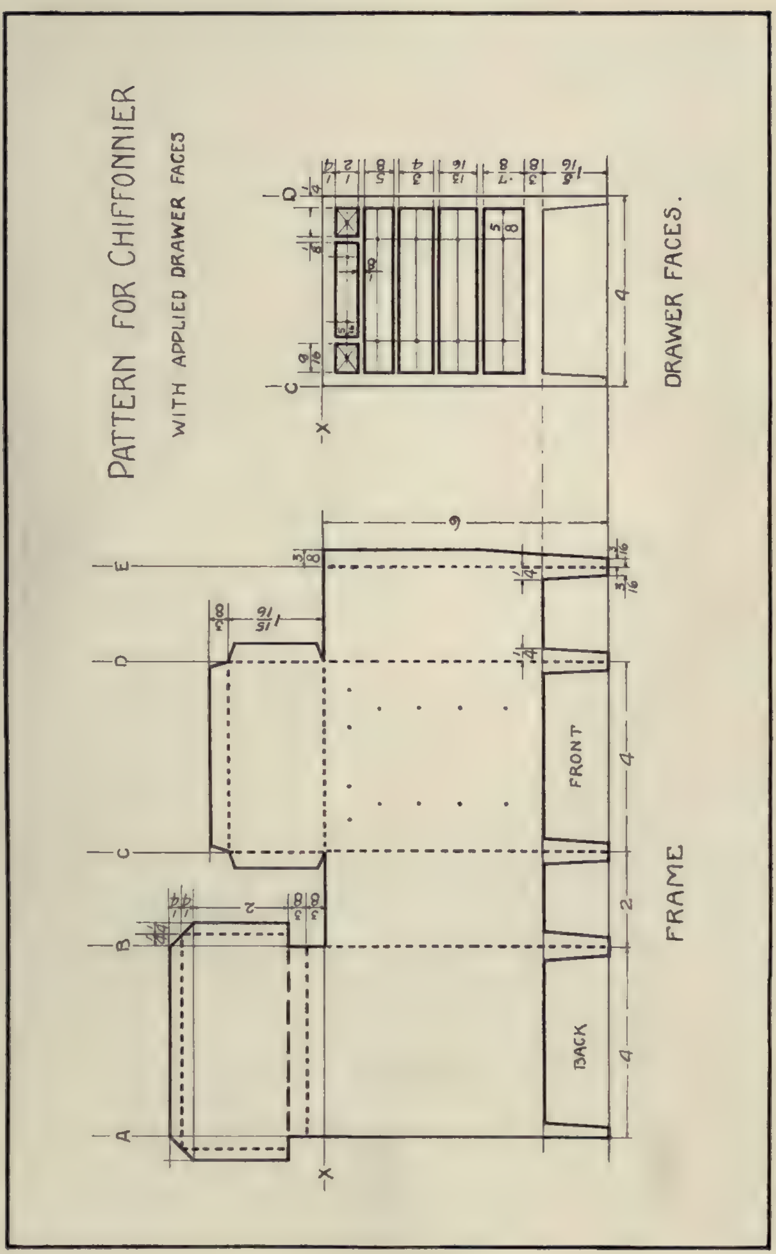


FIG. 38. THE CHIFFONNIER.

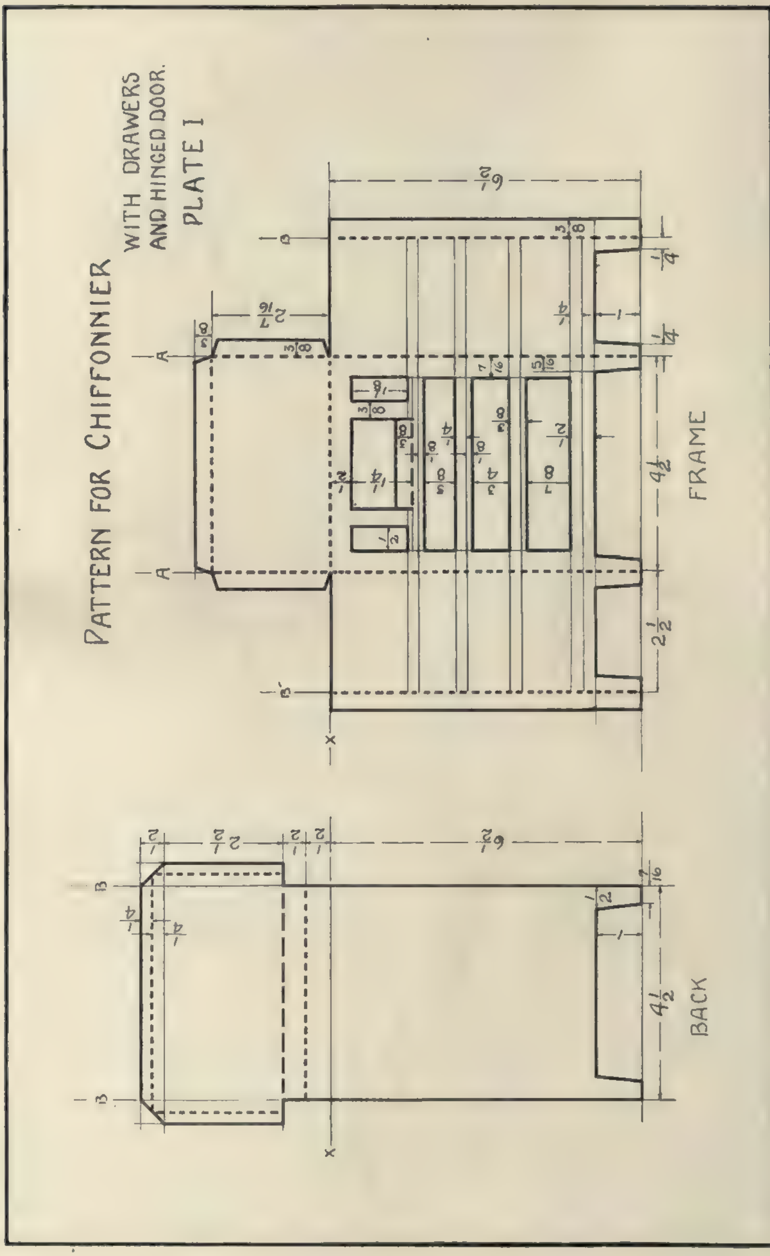


FIG. 39. THE CHIFFONNIER.

the shape of the strip seems harmonious with the whole and pleasing to the eye, then trace its shape upon the protecting rail and cut upon the tracing. See Fig. 38A and Fig. 39A.

AND HINGED DOOR.
CHIFFONNIER, WITH DRAWERS

See Fig. 39, Fig. 39A, and Fig. 40.

This pattern is for a larger chiffonnier with a hat cupboard. If desired it may be made with applied door and drawer faces by omitting all lines for openings or pasting from the pattern of the frame. An arrangement of the door and drawer faces is shown in Fig. 40. It is usually more profitable to have pupils design the arrangement of the parts of their own pieces.

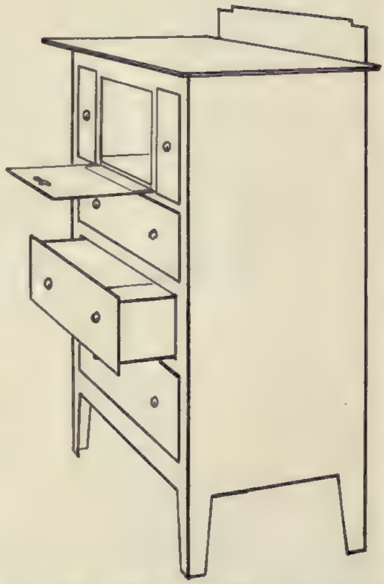


FIG. 39A. CHIFFONNIER WITH DRAWERS AND HINGED DOOR. THE DOOR AND ONE DRAWER ARE OPEN TO SHOW CONSTRUCTION.

The complete construction as shown in Fig. 39, Fig. 39A, and Fig. 40 is more difficult and the additional calculation for making the drawers is apt to discourage one from attempting to make original designs for the arrangement of the drawers. However, the relationships of the parts are definite and not hard to understand.

Original Design:—Plan the arrangement of the drawer and door spaces as desired. The openings for the drawers are $\frac{1}{8}''$ less on each side of the oblong than the drawer faces.

In door openings allow a $\frac{3}{8}''$ lap for a hinge and make the opening $\frac{1}{8}''$ less than the door on each of the other three sides.

The drawers are boxes $\frac{1}{16}''$ less in width and height than the openings and $\frac{1}{4}''$ less in depth than the frame.

Thus the drawer face extends a trifle over $\frac{1}{8}''$ beyond the box so that the drawer openings in the frame are well covered when the drawer is closed. See Fig. 39A.

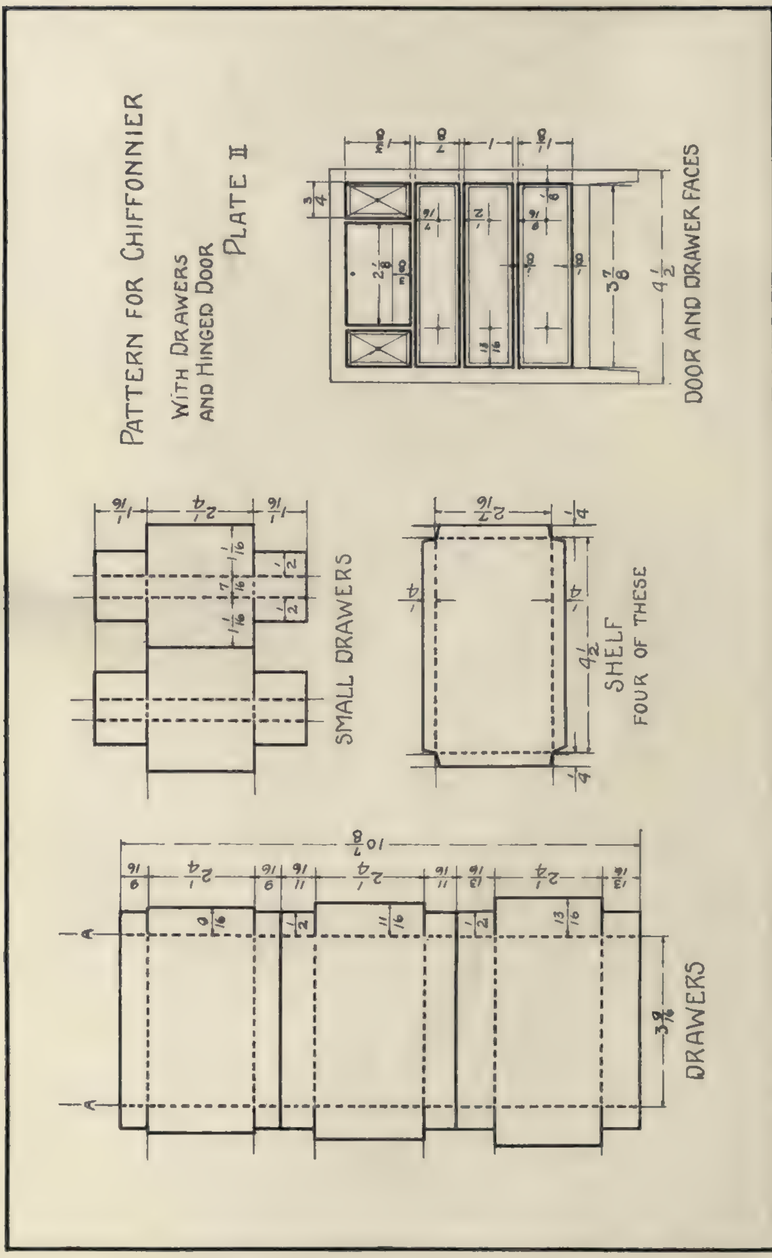


FIG. 40. DETAILS OF CHIFFONNIER.

Under each drawer is a shelf to support the drawers and strengthen the frame.

SPECIAL FEATURES IN CONSTRUCTION.

Order of Pasting:—Cut, score, and fold the frame. Cut, score, and fold the necessary shelves.

Slip a piece of paper over the hinge to protect it from glue.

Spread glue between the upper pair of pasting lines on the front section of the frame.

Hold a shelf with the laps turning down and paste it in place. Paste a shelf under each drawer.

Left Ends:—Paste the lap at the left end of the top to the top of the left side section.

Lay the frame on its left side.

Push the upper shelf above the upper pasting lines. Spread glue between the lines and push the shelf down into place.

Repeat with the rest of the shelves.

Right ends:—Turn the frame on its right side and repeat except that shelves must be pushed down before spreading the glue so that they may be held in place easily with the left hand during the process.

Back. Projecting Top:—Fold the outer $\frac{1}{4}''$ lap back upon the inner $\frac{1}{4}''$ spaces; glue together.

Protecting Rail:—Fold the upper $\frac{1}{2}''$ space down upon the $\frac{1}{2}''$ space just above line *X*. Glue.

Lay the frame, face downward, upon the desk. Spread glue upon the exposed laps of the top and the shelves.

Lay the back upon the frame with the line *X* meeting the top of the frame exactly. Press in place gently.

Turn the frame over and press the shelves in place firmly with a ruler inserted thru the openings in the front of the frame.

Paste the laps at the back of the side sections in place over the back section.

Pasting the Top:—Spread glue over the top of the frame. Adjust the projecting top. Invert the chiffonier and press while drying by inserting the finger or a ruler thru the openings next the top.

Protection Rail:—For method of designing the protecting rail see under description of chiffonnier with applied drawer faces.

Door:—Adjust the door to the hinge lap in the opening so that the edges project $\frac{1}{8}''$ at either side of the opening.

The lower edge of the door should meet the fold of the hinge. See Fig. 39A. Spread glue over the outside of the hinge and glue the door in place.

Drawers:—Make the drawer boxes. Cut out the drawer faces. Spread glue over the front of a drawer and lay it upon a drawer facing so that the pasting line $\frac{1}{8}''$ from each edge just shows at each side of the drawer. Press in place.

Repeat with other drawers, add drawer pulls and put the drawers in place in the frame.

Strengthening the Legs:—Cut, score thru the center lengthwise, and fold pieces of construction paper $\frac{1}{4}''$ longer and a trifle narrower than each leg. Glue them into the angles of the legs to stiffen them.

(*To be Continued.*)

ONE OF SIXTY-FIVE TYPEWRITER STANDS MADE FOR THE COMMERCIAL DEPARTMENT, WILLIAM L. DICKINSON HIGH SCHOOL, JERSEY CITY, N. J., BY FIRST YEAR PUPILS IN THE TECHNICAL AND INDUSTRIAL DEPARTMENT SHOPS.

SHOPWORK AND MATHEMATICS FOR GRADE I.[1]

JAMES MCKINNEY AND SARAH M. MOTT.

II.

Couch, Fig. 9:—Seat, $\frac{7}{8}''$x$2\frac{5}{8}''$x$6''$; feet, $\frac{1}{2}''$x$\frac{7}{8}''$x$6''$, (for two pieces); pillow, $\frac{3}{4}''$ dia. rod any length. (A hardwood dowel should not be used as it is too difficult to nail.)

Bed, Fig. 10:—Body, $\frac{7}{8}''$x$3\frac{5}{8}''$x$6''$ (ends cut square); end, $\frac{1}{4}''$x$3\frac{3}{4}''$x $7''$ (for two pieces).

Bureau, Fig. 11:—Body, $1\frac{1}{2}''$x$2\frac{1}{2}''$x$4''$; back, $\frac{1}{4}''$x$4\frac{1}{2}''$x$4''$; false drawers, $\frac{1}{8}''$x$1\frac{1}{4}''$, any length. (Sometimes drawers are only outlined by pencil marks.)

Sink, Fig. 12:—Bottom, $\frac{1}{2}''$x$2\frac{1}{4}''$x$6''$; draining boards, $\frac{1}{2}''$x$2\frac{1}{4}''$x$5''$, (for two pieces); ends $\frac{1}{4}''$x$2\frac{1}{2}''$x$7''$, (for two pieces); side pieces, $\frac{1}{8}''$x$1\frac{1}{4}''$ x $12''$, (for two pieces).

MAKING OF SINK.

The various pieces are all planed to width and cut off to length.

Assembling:—1. Draining boards are nailed on to the bottom, care being taken to have ends come even. 2. A pencil line is drawn across the middle of the ends ($1\frac{1}{2}''$ from ends). 3. The ends are laid on the bench and two $1''$ nails are driven in just above the pencil line so that the points show thru the boards. 4. The bottom is held in the vise, end up, the nail points are centered in the bottom and the nails driven "home". (Repeat for the other end.) 5. The side pieces are nailed on to the bottom.

Thruout all the making of furniture much individual work is done and as the various pieces are completed, the mathematics work may take different forms as for instance:

How much will two chairs cost at 2 dollars each?; How much will two chairs cost at 8 dollars each?; How much will four chairs cost at 3 dollars each?; etc.

What will it cost to furnish a dining-room if table costs 10 dollars, sideboard 10 dollars, and the four chairs 12 dollars? Similarly with the furniture for other rooms. Various combinations are used employing the facts known and introducing others.

[1] The first instalment of this article appeared in the June, 1913, number.

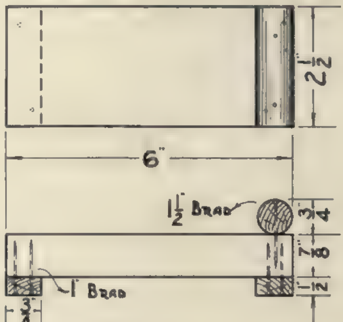


Fig. 9.
Couch.

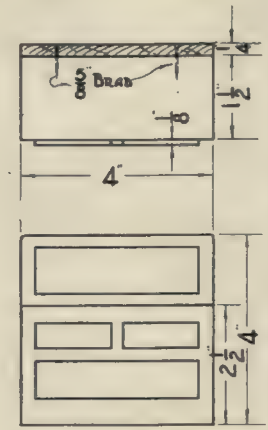


Fig. 11.
Bureau.

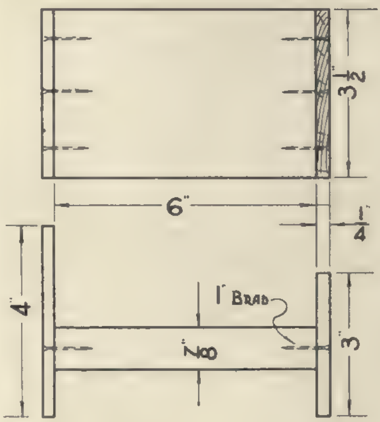


Fig. 10.
Bed.

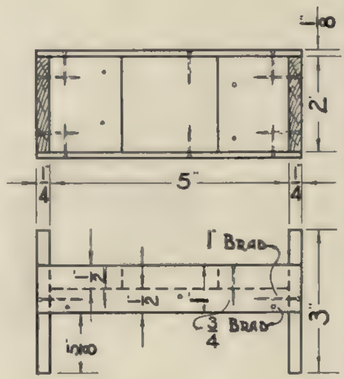


Fig. 12.
Sink.

Many questions in comparison also arise such as: Which requires more wood, a table or a chair, a bedstead or a couch? If wood of same cost is used, which would cost more? Which requires more nails, a clock or a table?, etc. Which requires more work? If it takes more time to make a sideboard than a table, which will cost more?

For convenience the class has been divided into two groups. While one group has been in the shop, the other has been making various

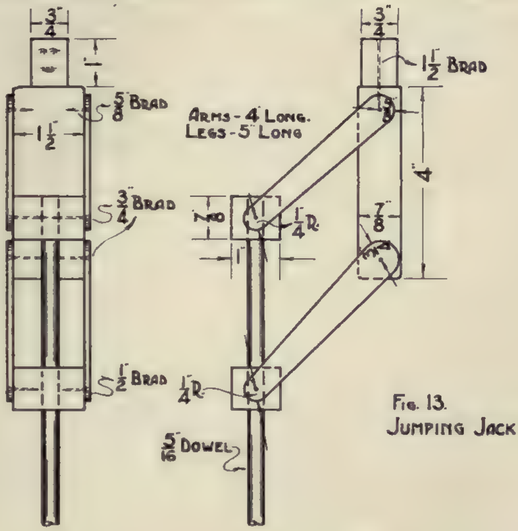


Fig. 13.
Jumping Jack

furnishings for the houses, including wall-paper, rugs, curtains, mattresses, pillows, bedding, dish towels, brooms, mail bags, bags for feed for horses, paper bags for grocery stores, and many clay articles used particularly in the stores. Art enters largely into these furnishings and the desire for suitable and tasteful things leads to much good work. Here too again, there is abundant mathematical material as most of the articles are made a given size and decorated in a conventional manner.

For a month or so the children are happy in making toys. Jumping Jacks, automobiles, horses, and carts are some of the things made. Many familiar measurements occur as will be seen in the drawings and the same familiar questions in mathematics arise.

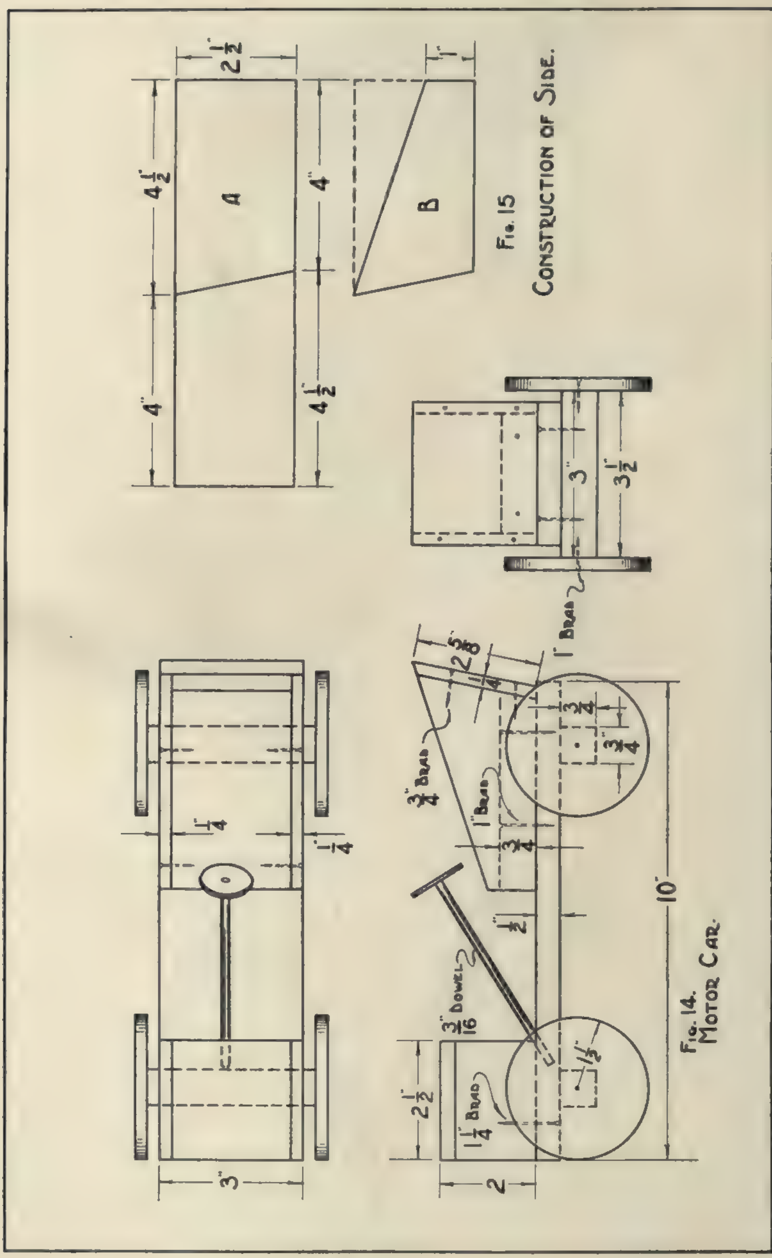


Fig. 15 Construction of Side.

Fig. 14. Motor Car.

Jumping Jack, Fig. 13:—Body, $\frac{7}{8}''$x$1\frac{3}{4}''$ length, anything over 4″; arms and legs, $\frac{1}{8}''$x1″x10″, (two pieces of this size); sliding pieces, a piece of the same stock as used for body, is cut off 2″ long, a $\frac{3}{8}''$ hole is bored thru, and then the piece is cut in two. The rod is a $\frac{5}{16}''$ dowel.

Assembling of Jumping Jack.—In nailing the arms to the sliding rod, the nails should be long enough to catch the rod. In the legs the nails should not touch the rod.

Motor Car, Fig. 14:—Base, $\frac{1}{2}''$x$3\frac{5}{8}''$x10″; engine hood, 2″x3″x$2\frac{1}{2}''$; seat box, $\frac{3}{4}''$x3″, length, anything over 4″ or $\frac{3}{4}''$x3″x4″; sides, $\frac{1}{4}''$x$2\frac{1}{2}''$ x$8\frac{1}{2}''$; axle, $\frac{3}{4}''$x$\frac{3}{4}''$x$3\frac{1}{2}''$; back, $\frac{1}{4}''$x$2\frac{1}{2}''$, length anything over 3″; wheels, soft wood roller turned to 3″ diameter, wheels cut off with miter saw.

MAKING OF MOTOR CAR.

Base.—One edge of the board is planed smooth, then measured for width and planed to size.

Engine Hood.—The block is held in the vise and two corners are chamfered by planing. No size is given for the chamfer, the child having to judge the amount from a given model.

Bottom of Seat.—The two edges are planed smooth. If length has to be cut off the piece of wood should be held in the vise. It may be found that some children are not strong enough to saw off this thick piece, if such is the case the bottom should be given cut to length.

Slides.—Along one edge a distance of 4″ is measured. On the opposite edge and from the same end $4\frac{1}{2}''$ is measured. A line is drawn connecting these points. The board is held in the vise for sawing and the cut is made on the line. See Fig. 15. On the square end of one of the boards a distance of 1″ is measured. From the corner of the beveled end a line is drawn thru this point. The side is now planed to size. This method is repeated for the other side.

The sides are now nailed to the bottom, care being taken to have the back and bottom edges come even.

Back.—The length of the back is obtained by laying the back of the seat on a board $2\frac{1}{2}''$ wide and marking off length with pencil lines. After sawing, this board is nailed on. Two $\frac{3}{4}''$ nails are driven into the bottom and one fine $\frac{5}{8}''$ nail into each side.

Axles.—A piece of wood long enough to make two is given each child. The four sides are planed smooth. The length is then measured and cut off to size.

Assembling.—(1) The axles are nailed, two 1″ nails for each piece. Nails should be about 1″ from ends. (2) The engine hood is held firmly in the vise and base or body nailed. (The nails should be entered with base lying on the bench.) (3) The seat is fixed by nailing thru bottom of seat, using two 1″ nails. (4) Wheels are nailed on with 1″ nails. A wheel which has a centered hole should be used as a template for making the center of the wheels. The steering wheel is a $\frac{3}{16}$″ dowel and a cardboard disk.

At the same time the children's mathematical knowledge begins to be classified, and to fall within somewhat more formal lines. Writing work is now given about twice a week. The class is usually able to count by 1's, 2's (even numbers), 5's, and 10's to any given number; by 4's to 20; by 3's to 18; by 6's to 18. They also know the doubles of all numbers to 10; can add 1 to any given number; one to doubles of numbers, such as:

4	6
4	6
1	1
—	—

Add intermediate numbers, such as:

2	3	4	6	7	8	9
3	4	5	5	6	7	8
—	—	—	—	—	—	—

Add 10 to any number, as:

1	5	8	etc.
10	10	10	
—	—	—	

Also add 2 to any even number.

Uneven numbers have not been as easily learned and we are not prepared to state what may be done here. Neither do we wish to say much about subtraction. So far we have found the Austrian method the most successful. Fractions are scarcely touched upon, nor is division, but at the end of the year the class has learned that mathematics enters into almost everything, that there is a necessity for mathematical calculation and that there is a real pleasure in accurate computation.

(*To be Continued.*)

EDITORIAL

WE have become convinced that the greatest source of evil in manual training lies in the fragmentary character of the time devoted to it. It is not difficult to reach the conclusion that the two greatest evils are the inability of the teaching staff to give proper instruction and the shortness of the time devoted to the work; and we believe that of these two the latter is the greater evil, because it makes adequate reform in teaching impossible. No matter how well prepared a teacher may be to give instruction he cannot produce the desired results either cultural or industrial when he does not see his pupils often enough to learn their names. We know of one city that, up to one year ago, was requiring a teacher to give instruction in woodworking to 390 pupils. He taught four classes a day; there were twenty pupils in a class, or eighty a day; if every class had been full there would have been 400 different pupils coming to that teacher, and no pupil came more than once a week and then only for one hour. To make the matter worse, the authorities would occasionally send thirty boys to work on twenty benches. Such conditions are intolerable, unreasonable; they kill the teacher and do almost no good to the pupils except give them an hour a week of relief from a crowded schoolroom. With the time required to take out tools and learn from the teacher what is to be done, and then the time to put away tools and clean up at the end of the lesson there is too little left for real thoughtful work. The curse of woodworking in the schools at the present time is thoughtless, unorganized, get-it-done-quick methods of procedure, and there is nothing that stimulates this more effectively than too short a time in which to do the work decently and in order, and a teacher who, because of the conditions under which he has been working, has lowered his standard and adopted a machine-like method of passing the boys thru his shop hour by hour and day by day until released from the unnatural strain by illness or a vacation. If we believe our psychology we know that the habits formed by pupils under such conditions are as likely to be detrimental as otherwise. It is a fair question to ask whether one hour a week spent under the conditions described is of any real benefit to the average boy. A few will benefit in spite of the conditions; a few others get no benefit whatever out of it—perhaps form bad habits;

what of the others? If your boy were in question, would you care to have him in the class? Would you take the risk? We have seen so much of the evils of this mere caricature of manual training that we can say without hesitation that it is far better to give three hours a week to woodworking for one year than one hour a week for three years, or even to omit all shopwork from the fifth, sixth and seventh grades and give four hours a week in the eighth, as is done in the city of Munich.

However, we do not believe that this alternative is necessary. The English plan of giving two and one-half or three hours a week in the two or three upper standards is likely to prove better here. There seems to us to be no good reason why in America sufficient time cannot be allowed to all pupils for handwork in grades below the second or third year of the high school, where more specialization is appropriate. There seems to us to be every good reason why a pupil should spend enough time on any kind of school work he is doing to do it thoroly. And there seems to us to be plenty of excellent reasons why a teacher should have time enough with his classes to teach the subject he has in hand effectively. In handwork he cannot do this on a mere recitation basis; there must be time for explanations and recitations, and there must be time for work. And then when we begin to demand industrial results from manual training, as we certainly should, the impossibility of the situation becomes apparent. No teacher of arithmetic or geography or English composition would think of claiming industrial results worth mentioning from his teaching if he were to have his pupils for only thirty-eight hours a year. It is our belief that whenever shopwork is given in the seventh and eighth grades at least two and a half hours a week should be given to the work. When given to high school pupils five hours a week is not too large a minimum time.

Time given to Manual Training

In order to gather some facts concerning the amount of time given to manual training in the public schools we sent out 300 postal cards asking for the number of hours spent in each grade from the sixth to the twelfth inclusive. From these we received 172 replies. To these we added data received in a previous investigation, making the total number of school systems represented 196. These cover all sections of the country and cities and

towns of all classes. A summary showing the number of cities by hours and grades is given in the following table:

	Grades						
Hours a week	6	7	8	9	10	11	12
1 hour	49	27	14	7	3	3	3
1 hour to 2 hours	81	117	117	31	24	15	9
2½ hours to 3 hours	5	19	28	25	21	13	9
3½ hours to 4 hours	3	4	8	32	24	22	14
4 to 5 hours	2	1	4	25	29	24	18
5 to 7½ hours	0	0	4	39	39	31	28
8 to 10 hours	0	1	1	4	7	8	4

In the above table there are many discouraging figures that bear out the statements made above and suggest others. It is especially discouraging to learn that there are cities giving only one hour a week to manual training in the high school. On the other hand there are many encouraging figures. Several of the cities listed maintain special vocational or pre-vocational schools in which from one-third to one-half of each school day is given to shopwork, but such schools are not included in figures above given. While it is, of course, true that these figures are far from complete, we believe they are fairly representative of present practice. In order, as we hope, to stimulate greater interest in this question we give below some "honorable mention" lists of cities giving what may be regarded as a reasonable amount of time to manual training. In a later issue during the present school year we would like to republish these lists and add to them any other names that belong in the lists but have not been included because of the limited character of our investigation. We especially urge our readers in such cities to inform us immediately of the facts concerning the time allowed for manual training. We hope too, that these lists may stimulate discussion and be of assistance in causing an increase of time in some places.

HONORABLE MENTION.

Cities giving 2½ or more hours to Manual Training in the Seventh Grade:

Aurora, Ill.	Joliet, Ill.	Oakland, Calif.
Beverly, Mass.	Lackawanna, N. Y.	Reno, Nevada.
Dallas, Texas.	Lewiston, Idaho.	Riverside, Calif.
Dothan, Ala.	Manchester, N. H.	Rochester, Minn.
Douglas, Ariz.	Michigan City, Ind.	San Jose, Calif.
East Chicago, Ind.	Mountain Home, Idaho.	Tahlequah, Okla.
Gary, Ind.	Needles, Calif.	Visalia, Calif.
Imperial, Calif.	Newton, Mass.	Wellsville, N. Y.

Cities giving 2½ or more hours to Manual Training in the Eighth Grade:

Aurora, Ill.
Austin, Texas.
Beaver Falls, Pa.
Berkeley, Calif.
Beverly, Mass.
Boulder, Colo.
Brunswick, Me.
Buffalo, N. Y.
Cambridge, Md.
Chattanooga, Tenn.
Crookston, Minn.
Dothan, Ala.
Douglas, Ariz.
East Chicago, Ind.
Faribault, Minn.
Gary, Ind.
Hibbing, Minn.
Independence, Kan.
Ironwood, Mich.
Joliet, Ill.
Lackawanna, N. Y.
LaGrange, Ill.
Lewiston, Idaho.
Manchester, N. H.
McComb, Miss.
Medford, Ore.
Michigan City, Ind.
Montgomery, Ala.
Mountain Home, Idaho.
Muskegon, Mich.
Needles, Calif.
Newton, Mass.
North Yakima, Wash.
Oakland, Calif.
Parkersburg, W. Va.
Red Wing, Minn.
Reno, Nevada.
Riverside, Calif.
Rochester, Minn.
San Antonio, Texas.
San Jose, Calif.
Sioux Falls, S. Dak.
Tahlequah, Okla.
Visalia, Calif.
Wellsville, N. Y.

Cities giving 5 or more hours to Manual Training in the Ninth Grade or first year of the High School.

Alliance, Neb.
Aurora, Ill.
Berkeley, Calif.
Billings, Mont.
Bluffton, Ind.
Boise, Idaho.
Boulder, Colo.
Butte, Mont.
Cattanooga, Tenn.
Chicago, Ill.
Chicopee, Mass.
Concord, N. H.
Covington, Ky.
Crookston, Minn.
Dallas, Texas.
Decatur, Ill.
Denver, Colo.
Des Moines, Ia.
Detroit, Mich.
Douglas, Ariz.
Faribault, Minn.
Fort Wayne, Ind.
Grafton, N. D.
Grand Forks, N. D.
Grand Rapids, Mich.
Grants Pass, Ore.
Green Bay, Wis.
Helena, Mont.
Hibbing, Minn.
Imperial, Calif.
Indianapolis, Ind.
Madison, Wis.
Marquette, Mich.
Newark, N. J.
Pasadena, Calif.
Santa Ana, Calif.
Santa Barbara, Calif.
Santa Monica, Calif.
Sedalia, Mo.
Sioux Falls, S. D.
Spring Valley, Minn.
Streator, Ill.
Syracuse, N. Y.
Venice, Calif.
Visalia, Calif.
Wellsville, N. Y.

Death of Miss Seegmiller With a feeling of personal loss we record the death of Miss Wilhelmina Seegmiller of Indianapolis. In the month of May, after an operation for appendicitis, she passed on into the more beautiful life. For eighteen years she directed and inspired the art instruction in the public schools of Indianapolis, and

during those same years came to exert a remarkable influence over the art instruction of the entire nation. Thru her public addresses, magazine articles, her books on construction work, and her excellent series of books for the use of the school children she won a place of high honor in her profession. One who ought to know has said that "in her death the country has lost its most inspiring leader among the teachers of beauty".

It seems cold and unsympathetic to speak of Miss Seegmiller as a former president of the Western Drawing and Manual Training Association, as a woman of rare administrative ability, tho Commissioner Kendall has spoken of her as the most remarkable women he ever knew in this respect, or as a trustee of the John Herron Art Institute, in which capacity she rendered important service to her city, because anyone who knew her realized that these were not the big things of her life—in fact, were mere incidents. Her life was in her desire to help others, and especially the children, to see and feel the beauty in art, in literature and in life. Her passion was to transmit the love for the beautiful, and in that her life was eminently successful. Her poems—especially "Little Rhymes for Little Readers" have been compared with Robert Louis Stevenson's "Child's Garden of Verses". Her drawing books have set a new standard in art instruction—a standard which says, "Nothing is too good for the child". Her life among the teachers of Indianapolis because of its gentleness, patience, fidelity to the highest ideals, has been and will continue to be an inspiration. Otto Stark, artist, and head of the art work in the Indianapolis Manual Training High School in a fine tribute shortly after her death said,

> "A teacher in the truest sense of the word, endowed to an unusual degree with executive and administrative ability, with noble purposes directing her great creative powers, she revolutionized the whole tendency of art education in the public schools. Full of initiative, endowed with wisdom and foresight, she was ever striving forward. Untiring in her devotion to her work, for which she had a passionate love, she inspired love and devotion toward it in those whose work she directed. With a tact which grew naturally out of her love for humanity she gave herself without reserve to those who needed help, encouragement and sympathy.
>
> "Such was the friend who for twenty years spent herself for the good of this community and has been a leader amongst us, and these are the qualities which endeared her so greatly to the children and teachers of our public schools and to her many friends at home and abroad."

A Message from William Hawley Smith

One day during summer school at Bradley Institute a young woman student from Texas who had just been reading "All the Children of All the People" came to the office with the inquiry, "Can't we get William Hawley Smith to give us a lecture? I have just learned that he lives in Peoria. I want to see him, now that I have read his book."

It was explained to the young woman that Mr. Smith's health might not permit him to give us a lecture, but that we might ask permission for the members of the school to call on him at his home some evening. The pilgrimage was arranged and proved to be the most delightful event of the summer. Mr. Smith took us into his friendly circle at once and told us many personal experiences and stories in his delightful and inimitable way. It was a never-to-be-forgotten evening. The next day we received the following from Mr. Smith, and gladly give it to our readers, wishing, however, that all might have been present on that summer evening.

THE TRANSFORMATION OF APPLES.

BY

WILLIAM HAWLEY SMITH.

They have been holding a summer school up at Bradley Institute this last few weeks, teaching teachers how to teach various and sundry manual arts. Some of them had read one or more of my books and when they happened to find out that I lived within a stone's throw of where they were attending school, the whole lot of them took a notion that they would like to come out and see what I looked like, where I lived, what sort of a home and a wife I had, and what manner of man I really was like, anyhow, when seen with the naked eye. So one of the number telephoned out, one afternoon, told me what they felt like doing, would like to do, and asked if I was willing they should do as they wanted to. And, dear gentle reader, if you want to know what my answer was, just imagine yourself in my place, and then think what you would say, under like circumstances. You see we are all much alike, in the great essentials of life, no matter, much, who we are, whether we have written books, or have read what is in them. So, of course, I told them to come, as many as wanted to; and they came, to the number of well nigh an even hundred. And that's that part of this story.

Now wife and I live on a little farm of six acres, just out of the city limits of Peoria, Ill. These teachers got out to our place just at dusk, and so had a chance to see the farm, in a sort of over-looking way, before it got real dark; and then we went up to the house and sat down under our old haw tree which stands just in front of our front door and spreads its wide branches over a circle that is seventy feet in diameter. And there we all sat and talked together

in the dim light that streamed out through the parlor windows, and cast a soft halo over the whole bunch. We had a fine visit together for an hour or so, during which time we all found out several things about ourselves and others that we had not known before, and then something unusual, and quite unlooked happened.

My wife (and this thing that I am telling about came to pass on the anniversary of our forty-third wedding day) always likes to look out for the stomachs of our guests as well as their heads and hearts. Now it so fell out that we had an Early Harvest apple-tree, down in the orchard, which was loaded with ripe apples, in their very prime. And what did wife do, when she found these people were coming out, but go and shake that tree, and bring down a bushel or more of the ripest, biggest and best that the tree bore (the ripest, biggest and best will always come down when a tree is shaken, while the green and unfit stay where they are till they are wrenched from their fastenings; and it is a good deal so in life), pick them up with the bloom still on them, and put them where she could easily get them when the time came for their appearing. That time came when we had been sitting under the haw tree and had visted about as much as we cared to for that time, and wife and our maid came down on us, bearing the apples in a big basket which was about all they could lift. We made a ring around the basket, and for the next half hour we ate apples, talking as we ate. It was great fun.

Just before our guests left us, I said a little verse for them, one which I dreamed some years ago, and one of the party asked if I would say it over again, and let him write it out? Of course I was glad to comply with his wish, and so I said it over, and he wrote it down. And then I added that it was always a pleasure to me to give away what things I had, which would leave me more after giving than before. Whereupon one of the guests said: "How about apples?"

Now I had no answer pat for this remark at the moment; but after they were all gone it came to me what I should have said. And because I couldn't say it then, I'm taking this way of saying it now, as follows: What I should have said was, "It is the same way with the apples as with the verse. By wife's giving them, and your taking them, they have been multiplied many fold; and, far more than that, they have been transformed from mere apples to a spiritual reality for all parties concerned! A few minutes ago they were mere bits of materiality, now they are immortal! They are now pleasant memories which will never fade out, bright spots in all our heavens of good fellowship. Indeed, I wonder if it would be sacrilege to say that they were the bread and wine of the sacramental feast we all had under the haw tree, and that they were really transubstantiated into the veritable body of spiritual reality, as we ate them together." That is what I should have said, and what I would have said, if my wits had worked as promptly as they should have done in view of the opportunity that teacher's question gave them. But second thoughts are also sometimes of value, if we can utilize them, and I'm doing my best to use what came to me after our guests had gone home and gone to bed. In fact, the thoughts I have set down came to me after I went to bed and before I went to sleep that night. I wonder if it isn't true that some of the best things that ever come to any of us drop in

on us when we are snugly in bed, are at peace with all the world, and in that blissful state between waking and sleeping. I wonder!

And, once started on this line of thinking, before I went to sleep some other things came to me, as follows: It came to me that it is the real business of life to change the material things of this world into spiritual realities, ever and always, and that if we fail to do that, we are not living up to our opportunities, by a long ways. If I had sold those apples merely, in the ordinary way of barter and sale, they might never have been anything more to me than a bit of bright metal that would wear a hole in my pocket if I carried it long enough. Of course, I might have changed that bit of metal for something that would help to build a larger life for me, for all substance must possess the quality of being transformed into something higher; but unless I used it in some such way, the outcome of the apples would be only of the earth earthy. And the same principle holds good, in all the affairs of life.

Thus, I went on thinking, if those teachers who have been to the Summer School, and have there learned how to hammer brass and iron, and fashion wood, hay and stubble, and how to teach others to do what they have learned to do—if they merely teach the children how to hammer brass and iron, and to fashion wood, hay and stubble, their work will never amount to much, for themselves or any one else. But, if they can, (and I believe they will, and that the apples will help them to it—these, secondarily, and the teaching they got primarily, for I know the teachers they worked with, and that they are genuine transformers of the stuff and the people they work with), I say, if these teachers who sat under the haw tree will teach their pupils so that the hammering of brass and iron, and the fashioning of wood, hay and stubble shall be to them a joy unspeakable and full of glory, then their lives will be worth living, and they won't have to wait till they die before they know what heaven is like. And what is true of these teachers is true of all teachers, and of all teaching.

These are the things I thought, and then I went to sleep, all the better for their thinking. And when I woke up in the morning these thoughts were still with me, and I wanted to pass them around, even as wife passed the apples around, so that they, too, might become more and more; so I wrote them out, and here they are for you whose eyes rest on this page. Help yourselves, and may God add to the increase!

In view of the fact that an increasing number of manual training teachers are willing to pay five per cent of their first year's salary and moving expenses to a distant city in order to increase their salary one or two hundred dollars, the following by John Burroughs may be a suggestion to someone:

"The lesson which life repeats and constantly enforces is 'Look under foot.' You are always nearer the divine and the true sources of your power than you think. The lure of the distant and the difficult is deceptive. The great opportunity is where you are. Do not despise your own place and hour. Every place is under the stars, every place is the centre of the world."

ASSOCIATIONS

WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.

The twentieth annual convention occurred in Des Moines, Iowa, May 7th to 10th, 1913, and a very successful meeting is reported. The immense coliseum provided an ideal place for the display of exhibits and the space was well filled in both educational and commercial departments. The program consisted of six general sessions, and the annual business meeting, besides round table discussions devoted to art, manual training, household arts, and vocational education.

Since it is expected that the annual volume of proceedings will be issued before this appears in print a full report of the convention is omitted at this time.

Urgent invitations for the next meeting were received from Nashville, Tenn., Grand Rapids, Mich., and Milwaukee, Wis., the Association finally voting to go to the last named city in 1914.

The following officers were elected for the new year: President, R. W. Selvidge, Peabody College for the Training of Teachers, Nashville, Tenn.; Vice-President, Regina Teigen, public schools, Sioux Falls, South Dakota; Secretary, Wilson H. Henderson, public schools, Hammond, Ind.; Treasurer, L. R. Abbott, public schools, Grand Rapids, Mich.; Auditor, R. C. Woolman, public schools, Des Moines, Iowa.

SCHOOL CRAFTS CLUB.

The third regular meeting of the year was held on Friday evening, March 14th, 1913, with a dinner at 6:30 followed by a program of two excellent addresses. The first was on "Side-Lights on the Zeitgeist in Germany," by Dr. James P. Haney, recently returned from several weeks of study abroad; and the second was on "The Craftsman and the Municipality," by William Laurel Harris, president of the Munical Art Society of New York.

The last meeting of the year was held on May 9th. After the dinner the following program was presented: "Wood as a Medium of Artistic Expression," by Professor William Noyes, Teachers College, the discussion being led by William F. Vroom; "Interior Decoration from Various Angles," illustrated by lantern slides, by Raymond P. Ensign, Pratt Institute, Brooklyn.

Professor Noyes illustrated his address by the use of a number of enlarged photographs which had been prepared for use in the Teachers College exhibit at the convention of the Eastern Art and Manual Training Teachers' Association. The very simple expedient of making 14″x19″ or larger bromide enlargements from 5″x7″ negatives of single pieces of furniture or other projects furnishes unique and unusually attractive exhibit material. The following is a skeleton outline of the discussion:

1. Woodworking is subject to the same principles of design that underlie all the space arts.

2. Familiarity with the principles gained by: (a) knowledge of the work of past masters of the art; (b) repeated application in constructive work.

3. The necessity for artistic guidance.

4. Possibilities and limitations of woodworking: (a) The thing made should be worth while; (b) Appropriateness to material; (c) Structural soundness; (d) Convenience in use; (e) Beautification.

5. Form considerations in creating beautiful things: (a) *Mass,* the appearance of the object as a whole; (b) *Line,* the character of boundaries, as well as notes of light and dark; (c) *Color,* harmony with surroundings; (d) *Finish,* emphasis of the quality of wood as wood.

6. Harmony of all these elements.

7. Logical method of procedure in designing simple wooden structures:

(a) *The fixing of the essentials*: (1) The approximate or definite size; (2) The kind of wood to be used; (3) The construction, including: kind of joint or joints; methods of opening and shutting or locking; appliances for lifting or moving or hanging.

(b) *The refining of proportions*: (1) Of the mass as a whole; (2) Of each part to the whole; (3) of each part to each other part; (4) Of each line within itself, if it curves or is a broken line, or is turned on a lathe.

(c) *Decoration.* This relates to the treatment on the surface: (1) Carving, border or surface (all-over) patterns in gouged lines or modeled; (2) Panels, carved in or constructed in; (3) Inlay or veneer; (4) Designing of accessories, handles, knobs, keys, plates, escutcheons.

(d) *Finish*: Stain, paint, oil, wax, shellac, varnish.

At the business session the following officers were elected for the year 1913-14: President, Fred P. Reagle, State Normal School, Montclair, N. J.; Vice-President, Morris Greenberg, 1006 Flushing Avenue, Brooklyn; Secretary, Charles W. Ledley, 775 St. John's Place, Brooklyn; Treasurer, Ezra Putnoi, 33 Morrell Street, Brooklyn.

NATIONAL EDUCATION ASSOCIATION.

The Fifty-First Annual Convention of the National Education Association was held at Salt Lake City, Utah, July 5th to 12th, 1913. The Department of Manual Training and Art Education held three sessions at which strong programs were presented, besides three sessions held jointly with other departments.

On Monday morning the program included: "Bringing the Vocational Work of the Public Schools Closer to Business Interests," by E. E. Scribner, superintendent of schools, Ishpeming, Mich.; "Diagnosing a Community's Needs as a Basis for Vocational Schools," by H. B. Wilson, superintendent of schools, Decatur, Ill.; "Report of Committee on College Entrance Requirements," by A. L. Williston, chairman, director, Wentworth Institute, Boston, Mass.

On Wednesday morning, in addition to the annual address by the president of the Department, A. L. Williston, two papers were read and discussed: "The Continuation School in Public Education," by Carroll G. Pearse, superintendent of schools, Milwaukee, Wisconsin; "Manual Work in Rural and Village Schools," by Professor E. P. Cubberley, Stanford University, Calif.

At the Wednesday afternoon session J. L. Fairbanks, a sculptor and painter of Salt Lake City, presided, the program dealing with the fine arts: "Art and American Life," by Professor R. B. Harshe, Stanford University; "The Schools as Art Centers," by T. A. Mott, superintendent of schools, Richmond, Indiana; "The Relation Between the Home and Art Instruction in the Elementary Schools," by Miss May Gearhardt, Los Angeles, Calif.

On Thursday afternoon a joint session with the Departments of Secondary Education and Science Instruction was held, with Supt. J. G. Collicott, Indianapolis, presiding. The following papers were presented: "What Do The Industries Require?," by L. D. Anderson, superintendent, U. S. Milling, Mining, and Refining Co., Midvale, Utah; "What the Schools Can Do to Meet the Demands of Both Industry and General Science," by E. O. Holland, superintendent of schools, Louisville, Ky.; "How Far Should Both Academic and Manual Arts Courses in the High Schools be Bent to Meet the Needs of Specific Vocations?," by W. B. Owen, principal, Chicago Teachers College.

The joint session with the American Home Economics Association was held on Friday afternoon, and considered the following topics: "Life, Too Is An Art," by Caroline Bartlett Crane, social and sanitary expert, Kalamazoo, Mich.; "Some Ideals in Household Economics Teaching," by Alba Bales, State Normal School, Lewiston, Idaho; "The Contribution of Industrial Education of Girls Toward Efficiency and a Fair Minimum Wage," by Irene E. McDermott, director of household arts, public schools, Pittsburgh.

CONNECTICUT MANUAL ARTS TEACHERS' ASSOCIATION.

One of the most successful meetings of the Connecticut Manual Arts Teachers' Association was held at New Britain on Saturday, April 26th, 1913. The local committee took great pains in arranging for the entertainment of the visitors, one of the features being a luncheon served at the New Britain Club.

The speakers in the Art Section were Mrs. Mannier and Miss Buxton, of Hartford, Miss Bennett of Middletown, and Miss Douglas of New London. The speakers in the Shop Section were William L. Hagen, New Britain, Lincoln W. Barnes, New Haven, F. J. Trinder, New Britain, William W. Leonard, Hartford, Osmer G. Beardley, Waterbury, and F. L. Glynn, Bridgeport.

It was the good fortune of the Association to secure Raymond P. Ensign, of Pratt Institute, Brooklyn, to give the principal address of the day, on "The Relation of the Teaching of Design to Home Decoration," illustrated.

In the large hall where the afternoon session was held there was installed an exhibit of about 900 drawings and 200 pieces of handwork of all kinds. In other parts of the building were hung exhibits from the New Britain Normal School and from the Traveling Exhibit which the Association has gathered together and sent about the state. As the city was holding a "Child Welfare Exhibit" at the time the members of the Association were afforded an excellent opportunity to study what is being done for the children of Connecticut.

The following officers were elected for the coming year: President, William L. Hagen, New Britain; Vice-President, Miss Emma R. Wright, New Haven; Secretary-Treasurer, J. Winthrop Andrews, New Britain. To serve on the

Executive Committee: Miss Isabelle Mackay, Danbury; Miss Mary Bennett, Middletown; F. D. Hitchcock, New London; and A. H. Wentworth, New Haven.

J. WINTHROP ANDREWS, Secretary,
New Britain, Conn.

CALIFORNIA ASSOCIATION OF APPLIED ARTS AND SCIENCES.

On April 29th, 1913, the Bay Associations of Fine Arts and Drawing, Home Economics, Manual Arts, and Agriculture, met in San Francsico, for the purpose of considering the advisability of uniting forces in some form of joint organization.

The deliberations resulted in a new organization under the title of the California Association of Applied Arts and Sciences. The following officers were elected: President, Miss Edith M. Bushnell, San Francisco; Vice-President, Miss Matie Pearl Clark, Oakland; Secretary, F. H. Beckmann, Mill Valley; Treasurer, W. G. Hummel, Berkeley.

According to the plans adopted the Association will hold three meetings each year, one at the time of the meeting of the Bay Section of the State Teachers' Association, one the third Saturday in March, and one the third Saturday in October. These dates are the same as those set for the meetings of the Bay Section of the California Association of Manual Arts.

F. H. BECKMANN, Secretary.
Mill Valley, Calif.

TEXAS STATE TEACHERS' ASSOCIATION.

The Industrial Arts Section of the Texas State Teachers' Association is made up of three "Divisions," as follows: Agricultural Division, leader, W. F. Barnett, superintendent of schools, Van Alstyne; Home Economics Division, leader, Miss Mary Gearing, Austin; Manual Arts Division, leader, E. M. Wyatt, Houston.

The principal paper at the general session of the Industrial Arts Section, at the recent Thirty-fourth Annual Convention of the Association, was read by J. E. Pearce, of the Austin High School, on the topic, "The Industrial Arts in Public Education."

Thru an oversight in assembling the material in the report of the Boston Manual Training Club in the June number due credit was not given for certain parts of the paper read by Ludwig Frank. Certain of the principles therein enumerated were taken from "Practical Arts," a Bulletin issued by the Fitchburg, Mass., State Normal School, and acknowledgement was made at the time but omitted from the manuscript when submitted to the Editor. This explanation is made at the request of Mr. Frank.

—EDITOR.

SHOP PROBLEMS

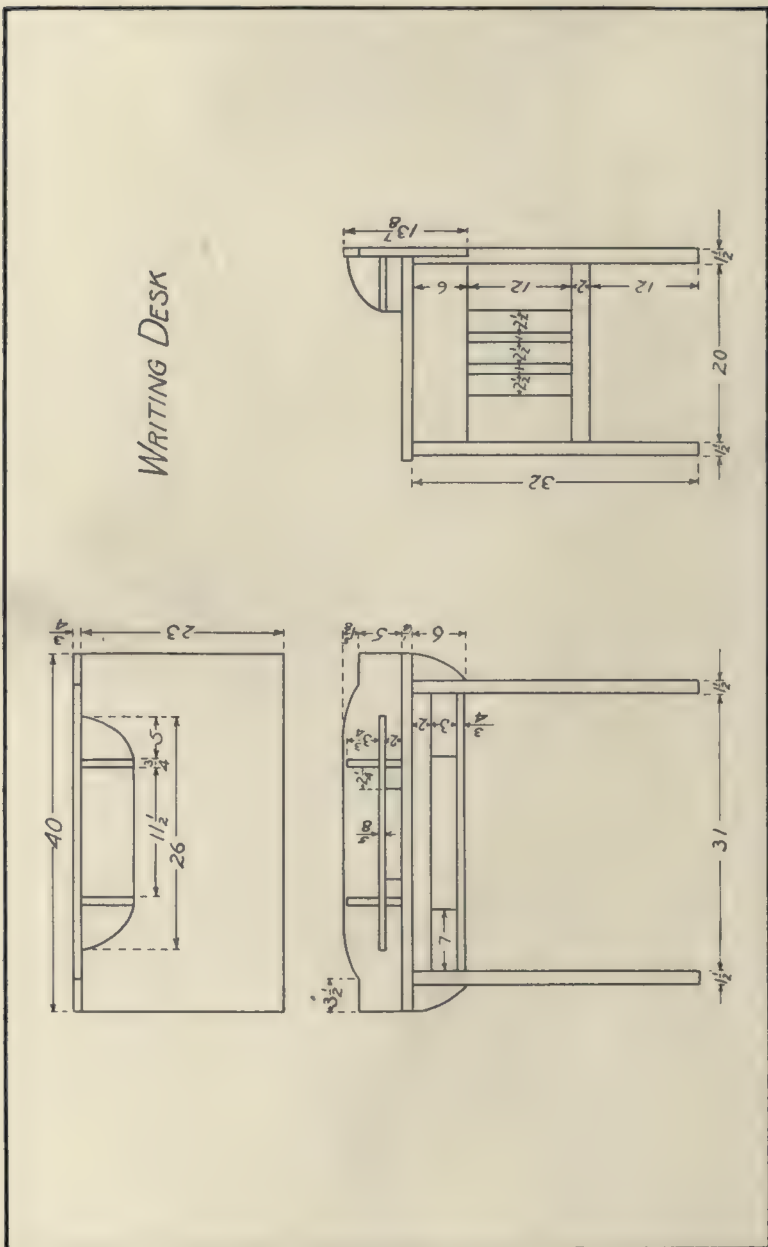
George A. Seaton Editor.

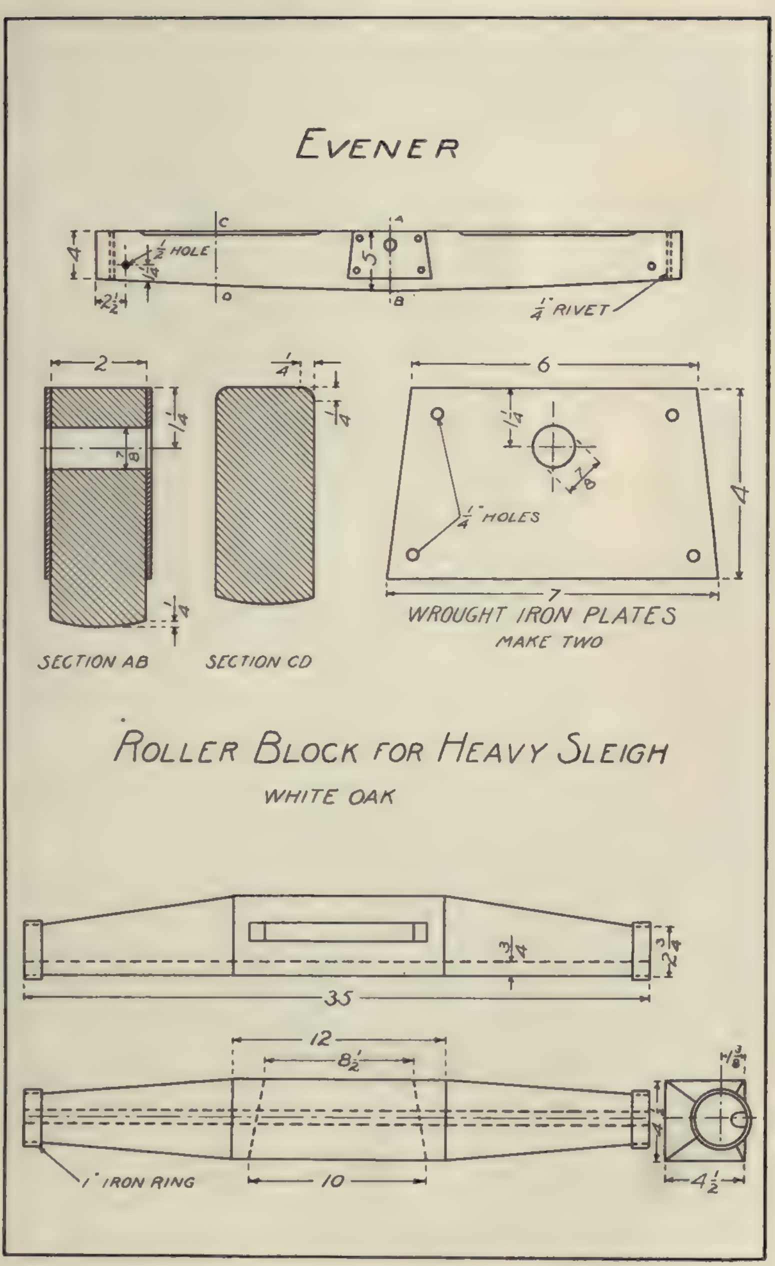
WRITING DESK.

The photograph gives an excellent idea of what might be termed a writing table, which was made by E. F. Kranquist, of the Northeastern State Normal

WRITING DESK.

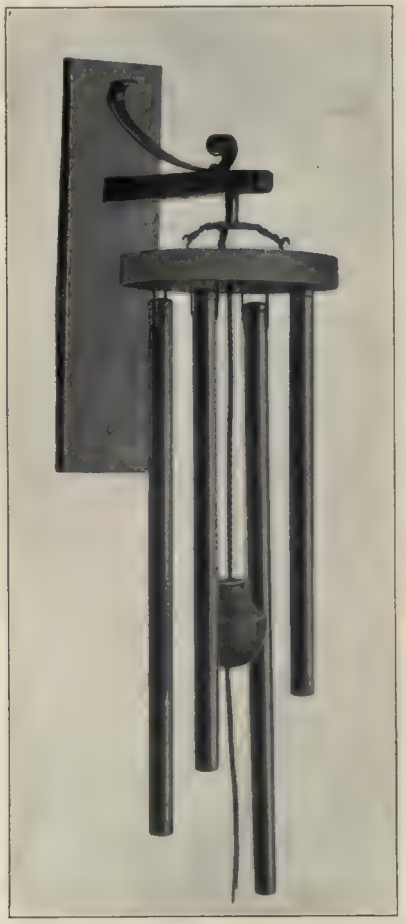
School, Tahlequah, Oklahoma. Special interest has been added by the well-applied brass trimmings. The pockets which are shown on either side of the central drawer are 8″ deep.


WRITING DESK


EVENER
1/2" HOLE
1/4" RIVET
SECTION AB
SECTION CD
1/4" HOLES
WROUGHT IRON PLATES
MAKE TWO
ROLLER BLOCK FOR HEAVY SLEIGH
WHITE OAK
1" IRON RING

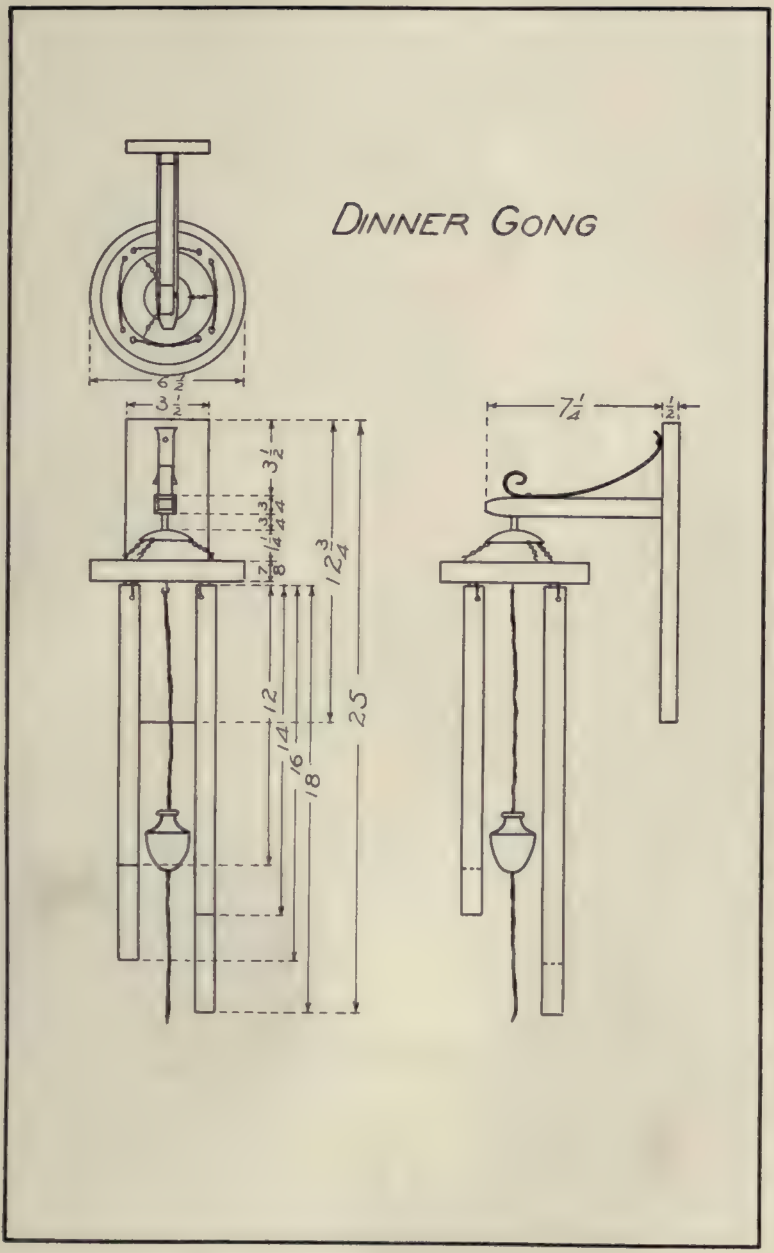
EVENER AND ROLLER BLOCK.

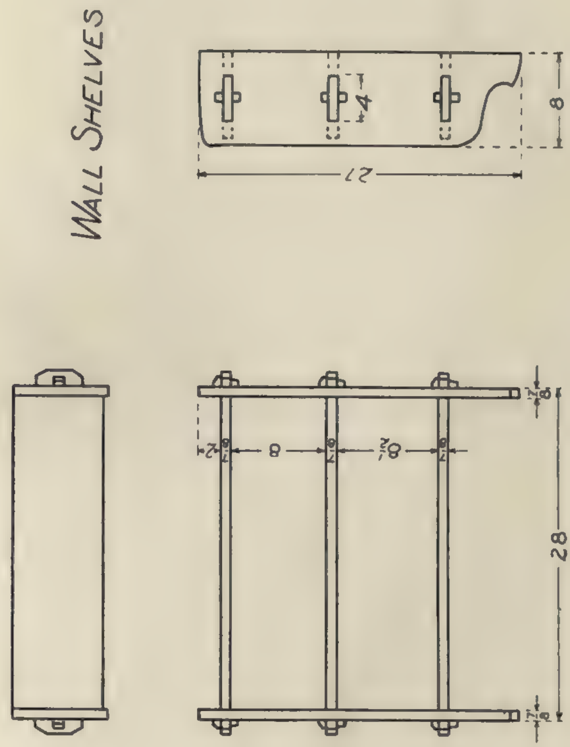
Two problems of particular interest to rural schools will be found in the drawings contributed to this department by A. D. Bailey, of Bemidji, Minnesota. Both the evener and the white oak roller block for a heavy sleigh proved of very practical value to the students taking the so-called "Short Course" in the public schools under Mr. Bailey's supervision.

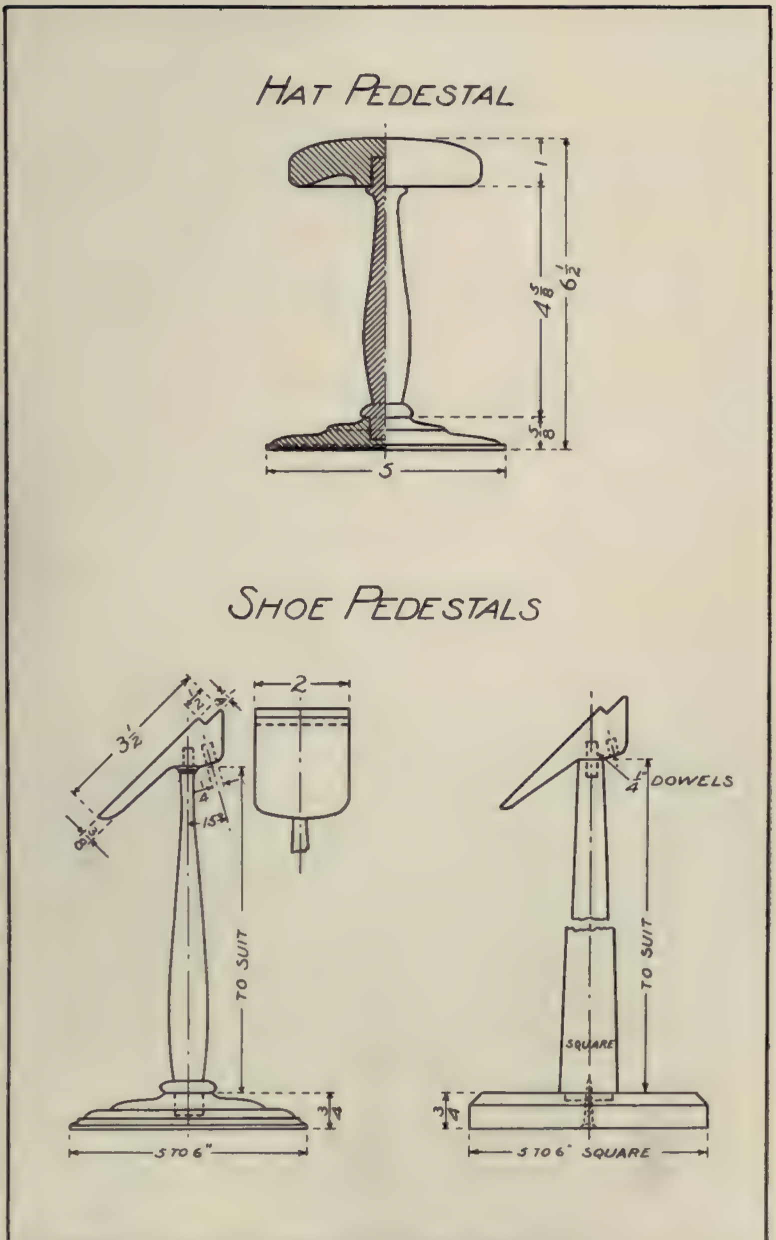


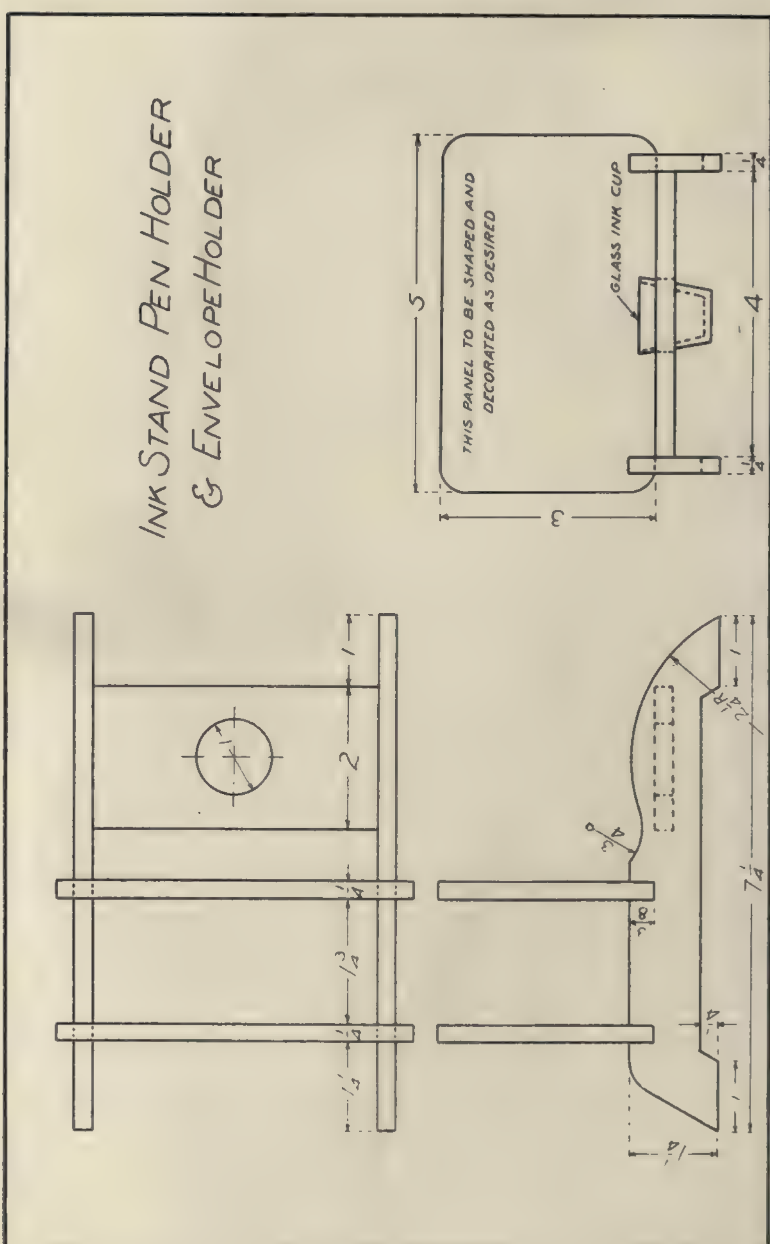
DINNER GONG.

The dinner gong designed by W. E. Hackett, of the Boys' High School, Reading, Pennsylvania, will prove a very attractive piece of work. It affords work in varied lines, bench-work, wood-turning, and light metalwork; yet it will be easy to complete it successfully. In cutting the tubing, care should be taken to have the pieces a trifle over length, in which case they may be tuned by filing.


DINNER GONG
6 1/2
3 1/2
7 1/4
1/2
3 1/2
3/4
3/4
1 1/4
7/8
12 3/4
12
14
16
18
25


WALL SHELVES
27
8
4
28


HAT PEDESTAL
1
4 5/8
6 1/2
5/8
5
SHOE PEDESTALS
3 1/2
2
TO SUIT
3/4
5 TO 6"
1/4 DOWELS
SQUARE
3/4
5 TO 6" SQUARE


INK STAND PEN HOLDER
& ENVELOPE HOLDER
THIS PANEL TO BE SHAPED AND DECORATED AS DESIRED
GLASS INK CUP

WALL SHELVES.

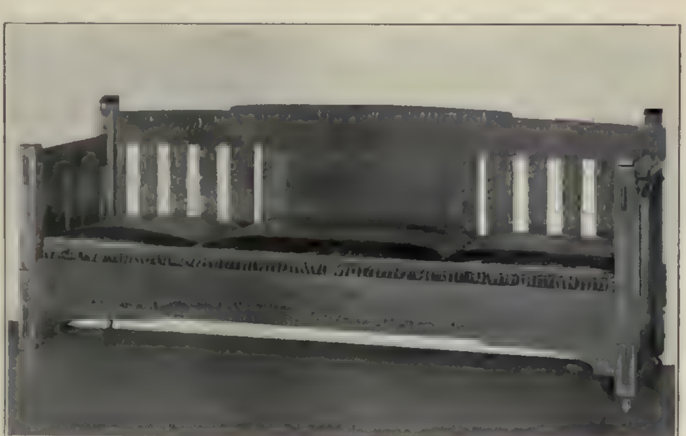
The rather conventional type of hanging book shelves is presented in the working drawings, the point of main interest being the exceedingly happy outline that has been achieved for the end pieces. The design is by W. E. Hackett, supervisor of manual training in Reading, Pennsylvania.

HAT AND SHOE PEDESTALS.

The hat and shoe pedestals which were submitted by D. K. Hiett, of East Orange, New Jersey, are projects which may have a special appeal to boys whose fathers run a retail store. Two of Mr. Hiett's boys made four dozen of these pedestals for use in the display window of their father's shoe store.

COMBINATION INK STAND.

A variation from the customary ink stand and pen holder is shown in this number, where an envelope holder has been added to the combination. The front panel of this envelope holder may be shaped and decorated to suit the taste of the individual. If a wood with as little grain as basswood is used, a design in color might be placed upon the panel. In working out similar parts, the suggestion is made that they be held together by brads while they are being shaped, to insure their being alike. This problem has been undertaken with interest by the boys working under A. J. Miller, of Pittsburgh.



BUILT BY DAVID L. JENKINS, STATE NORMAL SCHOOL, MILWAUKEE, WISCONSIN.

CURRENT ITEMS

A NEW TYPE OF MANUAL ARTS BUILDING.

The new building for the manual arts work of the high school at Rock Island, Illinois, sets a new standard for such structures. In several respects this building is worthy of study, but perhaps especially on account of its lighting. As will be seen from the floor plans and the perspective view herewith, the

NEW MANUAL ARTS BUILDING, ROCK ISLAND, ILLINOIS.

largest possible space is given to windows, and when it is known that most of the glass in these windows is of the "prism" variety, the exceptional quality of the lighting can be understood. For evening work the artificial lighting is almost equally perfect.

The building is 112x112 ft., and three stories high. There are no basement rooms, except where the heating plant is located. Between the ceiling of the boiler room and the ceiling level of the first floor there is a space about seven feet high which is used for lumber storage. This entire space is 35x45 ft. A part of this is partitioned off and made into a dry kiln. The details of this we hope to give in a later issue.

It will be noticed that the woodworking machinery room where stock is cut up for the classes is directly over the lumber storage space just mentioned. This makes it possible to pass all lumber up thru a trap-door. The mezzanine story for storing finished work or lumber is another economical feature of the building. The finishing room at the end of the hall is heated by steam instead of an air blast to lessen the amount of dust entering the room.

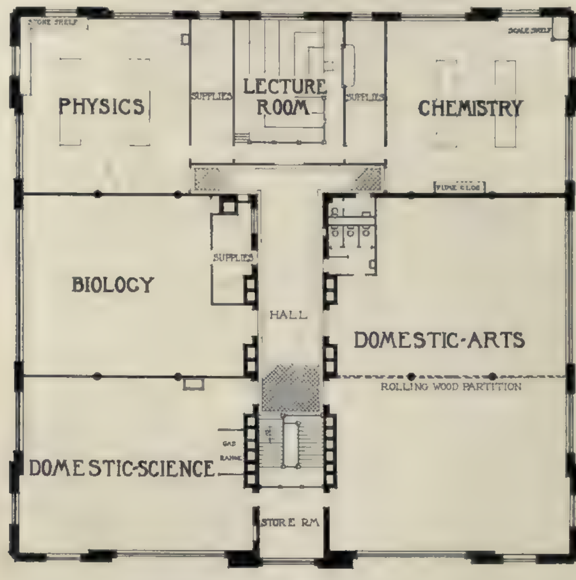
Another feature of the building is the cupola room built outside tne main walls of the foundry.

FIRST FLOOR PLAN

SECOND FLOOR PLAN

MANUAL ARTS BUILDING, ROCK ISLAND, ILLINOIS.

A. G. Hill, supervisor of manual arts, to whom we are indebted for the drawings here reproduced, deserves much of the credit for the design of this building and the arrangement of its equipment. The building was dedicated on the 28th of May.



THIRD FLOOR PLAN
MANUAL ARTS BUILDING, ROCK ISLAND, ILLINOIS.

A MANUAL TRAINING EXAMINATION.

Below are the questions used recently in a written examination for special uniform certificate to teach manual training in the state of Iowa:—

MANUAL TRAINING METHODS AND ORGANIZATION.

1. What are the important arguments for teaching manual training in the lower grades?
2. What are the important arguments for teaching manual training in the high school?
3. How can manual training in the school be related to the local industrial interests?
4. How can manual training be related to other school subjects? Give some definite examples.
5. How could you present a lesson in manual training so as to encourage real creative thinking on the part of the child?
6. In grammar grade woodworking, how much emphasis should be placed upon skill and technique, and how much upon a knowledge of the work and ability to solve problems in construction?

7. How could independence in solving problems in construction be developed?

8. Explain how you would teach a class in grammar grade woodworking the making of a book rack consisting of bottom and two ends to be fastened with screws.

9. Draw plan for rooms for high school woodworking, showing location of equipment.

10. Make outline of course of study in woodwork for seventh and eighth grades, assuming that such work begins in the seventh grade.

FREEHAND DRAWING AND DESIGN.

1. Define perspective. What is so-called "parallel" perspective? Angular perspective?

2. Make a drawing of some object in parallel perspective.

3. Draw plan of simple building and make a freehand drawing of same in angular perspective.

4. Make drawings of cylinder and of a cone in upright and inverted positions slightly below level of eye.

5. Compare the drawings of the fourth question, answering the following questions:

(a) What relation will axes of these drawings have to long diameters of the ends?

(b) How and where will the boundary lines of the curved surfaces meet the curves of the ends?

(c) Give rules for appearance of circles in their different positions.

6. Define constructive and decorative design. Illustrate.

7. What are the sources of ornament for decorative design?

8. Show how material will influence the character of a design as a design for silk and one for wood carving.

9. Make a design for some object to be constructed from wood.

10. Apply a suitable decoration to the object constructed in question nine.

HANDWORK FOR ELEMENTARY GRADES.

1. In what grades would you teach paper construction? Explain three problems in paper construction and tell in which grade you would use each.

2. In what grades would you teach cardboard construction? Explain three problems in this work and tell in what grades they should be given.

3. In what grades would you teach the making of books? Explain two problems in this work and tell where they would be given.

4. In what grades would you teach basket making? Explain three problems and tell where given.

5. In what grades would you teach clay work? Explain three problems and tell where they should be given.

6. In what grades would you teach whittling? Explain three problems and tell where given.

7. Explain how some historical story or incident may be illustrated by means of construction work in the primary grades.

8. In what grades would you teach weaving? Explain three problems and tell where each should be given.

BENCH WORK IN WOOD.

1. Give names of six woods used in manual training, state the principal characteristics of each and their most important commercial uses.

2. Describe the structure of wood as found in the common lumber tree and explain the properties of wood resulting from these facts of structure.

3. Describe the process of converting a forest tree into lumber suitable for high grade construction work.

4. What is a quarter-sawed board? A plain-sawed board? Explain fully the differences in the properties of these two boards.

5. Name the parts of a common plane and explain the uses of each part.

6. Explain clearly and in detail how to grind and sharpen a plane bit.

7. Explain in detail all the operations involved in joining two boards edge to edge with a dowel and glue joint.

8. Of what are the following materials composed: paste filler, varnish, oil stain, water stain, spirit stain, shellac, finishing wax? For what specific purpose is each used?

9. Explain clearly and in detail the differences between the *use, action* and *construction* of the ripping and cross-cutting saws.

10. Make drawings showing typical table construction. Explain how the top should be fastened, and give reasons.

JERSEY CITY MUNICIPAL EXHIBIT.

During the week of April 28, 1913, there was held in the 4th Regiment Armory, Jersey City, New Jersey, a Municipal Exhibit in which all the departments of the city government presented exhibits of their work. In addition to the Board of Education, the following departments participated: Public Library, Streets and Water, Health, Fire, and Police. Conservative estimates placed the number of visitors during the week at 40,000.

The accompanying photograph shows the section devoted to the Board of Education. The work in manual training from the elementary schools appears in the foreground, while in the center may be seen the exhibit of the Technical and Industrial Department of the William L. Dickinson High School.

This high school, a successful example of the "cosmopolitan" type, is making a conscious effort to meet the educational needs of "all the children of all the people" of Jersey City. Courses offering preparation for college or technological institutions, for commercial or industrial life, are all given under the one roof, and all are of equal importance in the recognition given them toward securing the diploma of the high school.

The Technical and Industrial Department was organized in January, 1912, with Frank E. Mathewson at its head. Two types of course of study have been outlined, of four years' and two years' duration. In the four-years' courses for boys the plan is to lay a foundation of general mechanical intelligence during the first two years, giving eighteen periods of work each week to the industrial

BOARD OF EDUCATION SECTION OF THE MUNICIPAL EXHIBIT, JERSEY CITY, N. J.

ADVANCED MACHINE CONSTRUCTION SHOP, WILLIAM L. DICKINSON HIGH SCHOOL, JERSEY CITY, N. J.

subjects, shopwork and mechanical drawing, and thirteen periods to the academic subjects, English, mathematics, and science. The industrial work for the first term consists of eight periods of woodwork, four of forging, and six of mechanical drawing. In the second term six periods are given to more advanced woodwork, six to machine-shop practice, and six to mechanical drawing. In the second year the industrial work consists of six periods of pattern-making, six of foundry practice, and six of drawing. The mechanical drawing thruout is closely coordinated with the shopwork.

For the work of the last two years the student may elect to specialize in some one line and spend the greater part of his time in learning as much as can be given to him in a school of any one of the various trades which the school is prepared to offer: machine-shop practice, carpentry, cabinet-making, pattern-making, electrical construction, printing, architectural drafting, mechanical drafting. During the last two years he must continue to take a certain amount of academic work, depending largely on the kind of special work he has elected.

The four-year courses for girls closely parallel those of the boys in the matter of the relative time devoted to shopwork, drawing, and academic work. The shopwork is given in six periods each of domestic science, domestic art, and applied design, thruout the two years. At the end of the second year the girl may, if she desires, specialize in her work, devoting the greater part of her school time to either dressmaking, millinery, applied design, costume design, or a domestic science course.

On the first of February, 1913, the Board of Education admitted to the high school a group of pupils from the eighth grade, boys and girls of fourteen or thereabouts, who would otherwise have gone to work because of their inability to complete a four-years' course in the high school. Courses were outlined for these boys and girls in both industrial and commercial subjects which would enable them to commence immediately to do some special kind of work, demanding a certain preparation for a skilled trade, and thus fit them in the shortest possible time to enter the industries, not as children who would be obliged to remain at the low wage of unskilled labor, but as children furnished with an experience in some skilled trade in which there can and will be future advancement. The courses are planned to cover two years, approximately the period of fourteen to sixteen years of age, and training is offered to both boys and girls in any one of the occupations which the school is prepared to teach.

The seventh Annual Convention of the National Society for the Promotion of Industrial Education will be held in the city of Grand Rapids, October 19-25 inclusive. This convention bids fair to be the greatest yet held by the Society in point of attendance, the importance of the questions to be discussed, the interest in the work of the Society and the cause which it represents, and the cooperation of other great national organizations of every kind.

The convention will open on Sunday, October 19th, with a series of meetings in the churches of Grand Rapids, which will be addressed by persons having special interest in and knowledge of the problems for the practical train-

ing of workers. There will be a series of meetings during the week culminating in the regular program of the Society.

The annual entertainment night will occur on the evening the 23d, followed by a two days' session, a portion of which will consist of a joint meeting between the National Society and the Chamber of Commerce of the United States. Such important personages as President Redfield of the Society, who is Secretary of Commerce, Governor Ferris of Michigan, Harry A. Wheeler, President of the Chamber of Commerce of the United States, President Van Hise of the University of Wisconsin and Dr. John Dewey will appear on the program.

The National Committee on Vocational Guidance will hold its annual meeting at the same time and place as the meetings of the National Society for the Promotion of Industrial Education. The meetings are so arranged as either to join or not to interfere. It is planned to bring about at this session of the Committee a permanent organization to be known as "The National Vocational Guidance Association."

This 1913 meeting should prove of unusual interest on this account, and because each year sees the development of new plans in this field and the further maturing of tried plans. Each succeeding meeting finds those present better able to speak from experience.

Cheshire L. Boone, formerly supervisor of manual arts in Montclair, New Jersey, has become business manager of the American Federation of Arts, in Washington, D. C. The business end of the Federation will be entirely reorganized making further expansion possible and placing the resources of the Society more completely at the service of its members and patrons.

Art and Progress, the magazine of the Federation, will be gradually increased in size, and scope. It will be enriched with study material, discussions of civic art, articles on the management of small museums, and much related art material, now more or less scattered about and difficult of access. The management hopes to see the magazine made the official organ of study clubs and art societies.

The Federation also plans to increase the value of its exhibition service. Last year over a quarter of a million dollars' worth of paintings and art objects were circulated. In time it should be possible that practically any town may have any sort of an exhibition it may wish. Of course the more support the movement secures and the more closely exhibits can be routed, the less expensive the exhibitions will prove for the individual towns. With its increased facilities and its practical ideals the Federation bids fair to take a high place among those forces which aim to elevate and improve American art.

Considerable interesting information is now available regarding plans for the educational features of the Panama-Pacific International Exposition. James A. Barr, who is Chief of the Department of Education for the Exposition and Head of the Bureau of Conventions and Societies, has already secured 151 congresses and conventions to meet in or near San Francisco during the Exposition. Twenty-

five foreign nations and thirty-five states have signified their intention of participating in the Exposition.

As now planned July, 1915, will be set aside as "Educational Month," during which a large number of educational organizations will meet, and conventions and exhibits will all be so correlated as to give attending teachers the widest opportunities possible to benefit from the various activities of the month.

The Palace of Education, in which educational exhibits will be housed, is in process of erection and will be ready by December, 1913. The exhibits will seek to show progress since the St. Louis Exposition in 1904. They will, by specializing on promising movements and reforms, attempt to forecast the education of tomorrow. There will be a comparative exhibit of all nations participating, and a comprehensive demonstration of educational work in the United States in all its phases from the kindergarten to the university.

The central thought in all exhibits should be a demonstration of the value of the course of study in the preparation of the students for life. In general the exhibits will consist of printed and written matter, maps, charts, apparatus, specimens, photographs and equipment, but best of all real children carrying on real school work under expert supervision. Such lines as manual training, cooking, sewing, laboratory work and physical culture readily lend themselves to class demonstration, and arrangements will be made for classes, in turn, to come from any city, school, or institution to San Francisco during the Exposition period and demonstrate the value of special lines of work.

The classification of proposed exhibits provides for "Vocational education toward specific training and occupation," "Agricultural education in the elementary and secondary schools," and "Boys' and Girls' Agricultural Clubs"—features of educational work which have not previously been recognized by any exposition. All in all the exhibits will emphasize the distinctive features of present educational progress.

Full information regarding plans and space may be secured by writing to Mr. Barr, of the Exposition Building, San Francisco.

Fall River, Massachusetts, has a new technical high school. The building is four stories in height and is finished outside in gray brick with granite and limestone trim. It contains forty-two rooms, most of the shops being located on the first and second floors. The school will offer four main courses: a technical course for boys, a technical course for girls, a clerical course and business course. The work of the first two years will be so planned that pupils who are obliged to may leave at the end of this time with a well rounded course accomplished.

The technical course for boys combines academic instruction with shopwork, the latter increasing in amount with the third year, and with opportunity for specialization in the fourth year, in woodworking, metalworking, electricity, architectural drafting or mechanical drafting. The business course for boys differs from the clerical course in that it aims to prepare the boys for the more responsible positions in the business world. The subjects given will include business organization, commercial design, advertising, salesmanship, and economics. Special lectures by business men will be a feature of this course.

The technical course for girls aims to meet the needs of four classes of girls: first, those who expect to become wage earners but have four years to give in preparation so that they may enter a skilled occupation, such as dressmaking, millinery, or designing; second, those who wish to combine a high school education with a study of household arts and science; third, those who have done creditable work in drawing and wish to become skilled in the arts and crafts; fourth, those who have no definite occupation in mind but who will be better prepared for home life by sudying the household arts and sciences.

The clerical course aims to prepare boys and girls for positions as clerks, bookkeepers, stenographers and secretaries.

William H. Dooley, of the Lowell Trade School, is the principal.

Several interesting modifications have been made in the mechanic arts course in the Decatur, Illinois, high school. The work has been so arranged that special students may come and go without interfering with the regular students. Another change is the concentration of more work in the first two years of the course, so that those who are obliged to leave high school early will have had the greatest possible amount of varied work in the time available. Students who expect to finish the high school or to go on to college will also by this change be better able to decide on a subject for specialization. Forge work, joinery and mechanical drawing will be offered the first semester. All studies in this first semester are required and include two hours a week of shop arithmetic, three of free hand drawing, five of mechanical drawing, six of woodwork, four of forging, five of algebra and five of English. The shop arithmetic is a new course, in which the problems are strictly business problems and deal with the work in hand. The course in freehand drawing is also new, being designed to teach the students how to make sketches of machine parts or problems in building and cabinet making. The ability to make such sketches and perspectives clearly and readily is regarded as a very essential qualification of a successful mechanic.

The course of study will soon include machine shop practice and foundry work, the equipment for which will be installed in February. Altogether this department in the Decatur high school seems to be in a state of healthy growth, and awake to the needs of all classes of students.

A novel plan was originated this summer by the boys of the manual training department of the Waukesha, Wisconsin, schools. The sixteen boys organized and were incorporated as a manufacturing company, rented the manual training shops of the Board of Education, and proceeded to make and sell furniture, and art craft articles. The superintendent of schools acted as treasurer of the company at the boys' request. When the company began work they had already secured advanced orders amounting to several hundred dollars. Three of the boys were sent out "on the road" as salesmen.

FOREIGN NOTES

by H. WILLIAMS SMITH.

The outstanding event, since my last notes, is the publication by the Board of Education of the report of the Consultative Committee on Practical Work in Secondary Schools. It is a bulky book, 9¾x6¼ inches, containing 412 pages, and costing 1s 9d. It may be safely asserted that every page is of interest, and that the report is worth every penny it costs. Up till now, the Board has issued a single sheet on Manual Instruction in Secondary Schools at 1d, and dear at the price; a fourpenny memorandum on the Teaching of Housecraft; and a penny leaflet on the Teaching of Needlework; all, together, having much the same effect upon you, as that on the proverbial donkey when you gave him oats. It was high time that something better was done by the Board of Education and now they have done it, and done it well. The quality of the report is not superior to that of the report on Manual Instruction in Elementary Schools issued a year or two ago, but the quantity of it is much greater, and it distinctly marks progress—very rapid and solid progress. It is to be understood that the report contains the record of the labors of a Consultative Committee called together by the Board of Education, and that the Board has approved and published it. There is no compulsion on any school whatever thruout England and Wales to carry out the reforms embodied in the report; it is suggestive only; it aims to be, not a tyrant, a despot, but a "guide, philospher, and friend." This is quite as it should be, and in conformity with English traditions. The Consultative Committee was composed largely of educationists, some well known, others wellnigh unknown, with a couple of M. P.'s, and the Rt. Hon. A. H. Dyke Acland, a former Minister of Education, and President of the Educational Handwork Association, was chairman. The Committe called before it fifty-two witnesses who included Sir R. Baden Powell, the Chief Scout; S. Carrodus, the Board's Inspector of Manual Training for London; Prof. J. J. Findlay; J. H. Judd, who lectured at Peoria, Illinois, some time back; Drs. McClure, Nunn, and Rouse; and J. Vaughan of Glasgow. The Committee sat for a period of about four years, and it will take quite four years more to get their suggestions into practice. The report contains an excellent analysis which will put the busy man in touch with it, pending leisure to read the report in detail. The report proper takes up only 65 pages; and is followed by syllabuses of work to page 131; by an historical sketch of handwork to page 140; and then to the end by evidence of witnesses. The report gives plentiful tokens of having been drawn up by an expert hand, and in every way reflects credit on its authors. Its effect should be almost immediate and very far-reaching. It gives proof that England is moving with accelerated speed to a front place in international manual training. Many Americans will, no doubt, wish to procure the report, but we regret that they will have to wait for another edition, as we learn, at present writing, that the first edition is exhausted; an excellent indication this, of public interest in the matter.

In England and Wales during the last educational year, 313,026 girls and 273 boys received instruction in cookery, 130,602 girls in laundering, 32,782 in housewifery, 9,129 in combined domestic subjects, and 190 in dairy work; in gardening 1,956 girls and 43,523 boys; handicraft 255,248 boys, and light woodwork 4,145 boys. The above were drawn from a total of 6,909,764 children.

The King desires his children to be dexterous, and himself has practised several manual occupations, with a preference for woodwork. One of his sons, Prince Albert, is never so happy as when using plane and saw. The upbringing of the youthful Royal Family is admired by most English folk, and, as far as is possible with such abnormally-placed persons, it is on the lines of "learning-by-doing."

The Times issues an Educational Supplement once a month (it ought to be once a week) in which manual training comes in for a share of notice. In a recent article, a writer contended for construction as opposed to manipulation. He would rather see work done with prepared material than have it wrought entirely by pupils.

Here are a few recent utterances:— "Our Primary Schools train clerks, teachers, and casual laborers. The parents, no less than the schoolmaster, are infused with the worship of a clerkly education." Mr. W. Welpton, Leeds University.

"By our educational system we do not want to make our laborers into clerks, but to make them better men in the occupation they take up. Unless it makes an agricultural laborer a better laborer, an artisan a better artisan, in fact, every man a better man in his own occupation, whatever that may be, I think our educational system a failure." Lord Joicey (a captain of industry).

"The American boy, both at home and in school, is braced up to realize that in this world he must fight for what he wants. His school atmosphere is fresh, invigorating. He is made to understand that lessons are a training for life. I should say, not 5 per cent of English boys have any glimmer of that." H. A. Milton in *The Daily Mail.*

"The Board of Education fully recognizes that facilities for hand and eye training, originally introduced into our schools by help of the City Guilds, should be provided in every elementary school; that workshop training or its equivalent, should be made a prominent feature of the instruction; and that the teaching should be disciplinary rather than commercial." Sir. P. Magnus in *The Morning Post.*

It is rather hard on Him of Austria that He of Germany is always referred to as *the* Kaiser, but strong individuality in monarchs, as in teachers, will tell. The latest phase of the Kaiser's versatility is the setting of 150 soldiers to building two Roman forts, with Roman tools, under archeological supervision, so that German school boys may the better comprehend their Caesar—and, perhaps Kaiser. The teachers are not so pleased as the boys. They are of opinion that there is too much method and too little education in such doings.

Dr. Rurik Holm is now director of the famous Nääs school in Sweden, where Otto Salomon labored long and fruitfully. Dr. Holm is thirty-six years of age, is a graduate from the University of Lund, where for a while he was *Docent* in History, and has since been an inspector of elementary schools in Gothenberg.

An interesting and practical branch of handwork has lately been introduced into school workshops in Brünn, Germany. The pupils learn to pack and wrap prettily and suitably for transportation various objects, to weight them, and to fill various post or railway forms for home and foreign trade. Examples of this kind of exercise were exhibited at the Congress of Handicraft Teaching in Vienna.

At the Public School for Chinese in Shanghai, nature work, coloring, pencil work, and some handwork in the way of paper and cardboard modeling is being done. The school also possesses a band of sixty members, a strong football team, and the beginnings of a school museum.

The new buildings of the Kimberley (South Africa) Girl's High School comprise a needlework room, science-room, and a well equipped cookery-room, The Boys' High School has also a good manual workshop.

In the opinion of the Catholic Headmasters' Association of Ireland, manual instruction is not a suitable subject to be placed on the programme of the intermediate schools. Perhaps, when Ireland gets home rule and occupies the place among the nations which it ought to occupy, it will be found that manual training is not only wanted in the intermediate schools (whatever they are) but in *all* schools.

The Educational News of Scotland recently said some pertinent things on the desirability of abolishing the "double" centre. There is a growing feeling that the awkward arrangement of two teachers instructing one class will soon have to be consigned to limbo. The "single" centres and plenty of them seem now the desiderata.

Wiltshire is going to devote each afternoon to practical subjects in ten schools, whilst three afternoons a week will be allotted to such work in forty-six other schools. In addition it is proposed to introduce into forty-four schools a graduated course of manual work based on plastics, to be followed by paper and cardboard modeling, and eventually by some more definite forms of manual training. Further, gardening is to be taught in twenty-eight schools, and in certain selected schools, metal work, leather work, rug and basket making, etc. All this work is to be undertaken by the regular staff of the schools and not by specialist teachers. It's a big order!

Between 1902 and 1908 the number of school gardens in England increased from 349 to 1,505, and the number of pupils under instruction from 5,508 to 24,316. In Leicestershire alone the gardens increased from 2 in 1903 to 52 in

1912. What can be conceived more truly educational, when it can be had, than a school garden?

Manchester and Salford are emulating London in their Recreative Evening Classes. Wood and metal working, straw-hat making and basketry, leather-embossing and paper-flower making are taught. Not least, of many other subjects, the children are taught to dance.

In Manchester, cookery is taught at 47 centres to 8,089 girls, laundry work at 16 centres to 3,585 girls, and housewifery at 10 centres to 572 girls.

Mrs. Rurgwin, the superintendent of London's special schools,—school for the mentally and physically deficient—claims that the change from whole-time class teaching to a system of half-time practical work has been a decided success.

The Evening Play Centres of London, founded by the novelist, Mrs. Humphry Ward, now number 21, with an attendance last session of 1,300,000, and a weekly average attendance of about 50,000. This and other causes are contributing to a dearth of real bad boys in London. We don't want a dearth of bad boys of the "Tom Sawyer" type. The authorities used to send 100 boys a year to Welsh farms with a view to reforming them; now they can't rake up half that number. Further a large industrial school at Feltham has had to be closed on account of the famine of bad boys. It is proposed now to give similar advantages to the good boys. Dickens pointed out this anomaly fifty years back.

The visit of forty-seven members of the Columbia Park Boys' Club, San Francisco, to London attracted great attention. It was interesting to learn that proficiency in handicrafts was an essential requirement in the selection of the fortunate lads to go on a world tour.

Queen Alexandra opened the twenty-ninth exhibition of the Home Arts and Industries Association which was founded by Charles Godfrey Leland, the famous American who spent much of his life and did a grand work in England. This association seems destined to live long and prosper since high society smiles regularly upon it.

Mrs. Page, wife of the American Ambassador, was present recently at a school-garden prize-giving in St. Pancras, London.

REVIEWS

Stories of Useful Inventions. By Dr. S. E. Forman, The Century Co. publishers, New York City, 1911. 7½x5 inches; 248 pages; price 60 cents, net.

This book ought to find a broad field of usefulness in school and in the home. It gives in a clear and simple, yet forceful manner the story of the Match, the Stove, the Lamp, the Forge, the Steam-engine, the Plow, the Reaper, the Mill, the Loom, the House, the Carriage, the Boat, the Clock, the Book and the Message. "From the history of these inventions we learn how man became the master of the world of nature around him, how he brought fire and air and earth and water under his control and compelled them to do his will and work. * * * These stories, therefore, are stories of human progress; they are chapters in the history of civilization." As such they are suitable for supplementary reading in the regular academic school work and for regular reading matter in the vocational schools. The style is such and the illustrations so plentiful that very many children will find it interesting home reading.

It is not possible to give each child experience in every line of industrial endeavor in shopwork or other industrial pursuits. It is possible, however, to give each boy experience in at least one line of endeavor. Just such readings as books such as this contain will assist the pupil to "carry over" habits formed in one line of industrial activity into another. There is no reason why this kind of reading should not be given early in the course, even in the intermediate grades. Follow it with readings of industrial subjects differentiated to suit individual or group needs and we shall have a correlation of academic and industrial activities that is superior to our present type of correlation where this informational matter must be obtained by an insufficient experience and at the expense of time that ought to be given to more serious practical experience in handwork.

—Ira S. Griffith.

Color Balance Illustrated: An Introduction to The Munsell System. By A. H. Munsell. Press of the George H. Ellis Co., Boston, 1913. Paper, 5½x7½ inches; 32 pages.

A color primer or manual, prepared at the request of many teachers, as an introduction to the study of color by definite and measured relations. It outlines a plan of study for nine school years, with model lessons which have proved successful in the schoolroom. It is illustrated by numerous line drawings and a color plate, to assist teachers in gaining clear ideas of color groups whose quantities and qualities preserve visual balance and are therefore called beautiful.

Those who wish to pursue the study further will find frequent references to a larger treatment of the subject in "A Color Notation" and "Atlas" by the same author.

The Use of the Plant in Decorative Design. By Maud Lawrence and Caroline Sheldon. Scott, Foresman and Company; 7½x10 inches; Part I, 78 pages of text, 23 plates; Part II, 86 pages of text, 30 plates; teachers' editions $1.25 each; pupils' editions, 35 cents each.

The pupils' edition of these two books, one for the grades and one for the high school, consists of plates; the teachers' edition includes with the plates, much helpful and well organized text material. Opposite each plate is an explanatory page. In the teachers' edition the plates are placed together in the latter half of the books. A complete table of contents is found in each volume.

The plates are grouped to show a natural development from the rendering of a flower or spray direct from nature, thru the study of details, conventionalization, making a unit, and the decorative design, to the application of light and dark and color. The subject matter is equally well arranged and is logical and definite. All the important principles of design are presented together with many lesson outlines, and analyses of design material.

The real distinction of the books, however, is the quality of the plates. They are clear, large, and cleanly-printed to begin with; those showing pencil rendering are wonderfully faithful in reproduction of such handling, and show brilliant execution on the part of the artist; those done in values are very soft and attractive; while the color plates are so harmonious, so subdued yet fresh in tone, so altogether charming that it would seem they must satisfy the most critical judge.

The high school book contains studies in the crafts, wood-block printing, embroidery, leather, metal, and jewelry, all commendable in design. It remains only to add that the exterior of the books is as pleasing and satisfying as the contents. —V. E. W.

Art and Industry in Education. The Arts and Crafts Club, Teachers College, Columbia University, 7x9½ inches; 103 pages; price 50 cents.

This is the second number of a publication by the Arts and Crafts Club of Teachers College. Like the first it is an artistic piece of magazine-making and in subject matter is even more attractive to the general student than the first. There are several brief articles which will prove of interest to manual arts teachers, notably Cement and Concrete, What's in a Name?, Good Furniture, A Problem in Fine and Industrial Arts, and Experimental Work in Industrial Arts as a Means of Efficiency.

The Arts and Crafts Club have performed a real service in thus bringing to teachers in distant places a breath of the atmosphere which permeates a great educational laboratory such as Teachers College.

The Boy Mechanic. Popular Mechanics Co., Chicago; 7¼x10 inches; 469 pages; price $1.50.

Those who are familiar with the magazine, *Popular Mechanics,* will find in this book a valuable collection of the brief, descriptive paragraphs characteristic of that journal. Seven hundred different things boys can make are presented, with eight hundred accompanying illustrations. This wealth of material is not

arranged in any particular order but an index is given at the close. The subject-matter includes every imaginable mechanical device, from toys to household conveniences, and bits of helpful information are inserted here and there to fill out uneven pages.

The Service of the Hand in the School by Woutrina A. Bone, Longmans, Green, and Co.; 5x7½ inches; 212 pages.

The author of this little handbook, who is a lecturer on education in the University of Sheffield, England, modestly calls it "a little record of school practice." The book is more than that; it is a careful study of the psychology of handwork, of the motives which underlie the activities of children, and of the related social and historical material. It is in such matters that the value of English books on manual training is generally found for American teachers, since, naturally different materials and conditions make the descriptions of models and working directions of little use. Many of the models included in English books on manual training may seem trivial but American teachers can surely profit from a study of the point of view, and of the thought-content of a manual training course, which is well expressed in Miss Bone's book.

—V. E. W.

Basic Principles of Domestic Science by Lilla Frich, Muncie Normal Institute, publishers, Muncie, Indiana; 6½x9¼ inches; 198 pages.

This is a conveniently arranged book which may be placed in the hands of students of domestic science. Lessons in theory are placed opposite the lessons in corresponding practice. The practice lessons consist of directions and recipes, illustrated with half-tones. The lessons are arranged by semesters. At the close of each section blank pages for note-taking are grouped, and space is allowed for the insertion of additional note-paper. Many tables and dietary studies are included, making the book comprehensive as well as practical for school-room use. The author is supervisor of domestic science in the Minneapolis public schools.

Elementary Applied Chemistry. By Lewis B. Allyn, Department of Chemistry, State Normal School, Westfield, Mass. Ginn & Co.

This volume consists of selected experiments designed to illustrate the physical and chemical changes involved in many common occurrences. A rather wide range of subjects is treated; for example, experiments in simple filtration, acids and alkalies, standard solutions, baking powder, milk and allied products, food preservatives and food values, including the Kjeldahl method for nitrogen and the extraction method for fats. Because of the large number of more advanced experiments, the best results could be obtained from the use of the book with students who have had a good year of general chemistry preparation.

The appearance of the book is very attractive. —George C. Ashman.

The Essentials of Physics. By George Anthony Hill. Ginn & Co., Boston. 1912. 7½x5¼ in., pp. 344.

This is a text-book on elementary physics by a former assistant professor of physics at Harvard University.

Plane Geometry. By William Betz and Harrison E. Webb. Ginn & Co., Boston, 1912. 7¼x5 in., pp. 332.

The aim of this book is to effect a compromise between the reformers and the overconservative writers on mathematics. Many construction problems and practical applications of geometric principles are found in the book.

RECEIVED.

Child Labor and Poverty. The May number of the Child Labor Bulletin published by the National Child Labor Committee, 105 East 22d Street, New York, N. Y. Price $1.00.

Exceptional Children in the Public Schools of New Orleans. Report of the Committee of the Public School Alliance, March, 1913. Anyone studying exceptional children should procure a copy of this report by Dr. David S. Hill of Newcomb College and Joseph M. Gwinn, superintendent of schools New Orleans.

Souvenir of the Manual Training and Industrial School of New London, Connecticut. This consists of twenty-two plates of views of shops and other workrooms, also courses of instruction.

Manual Training in the Public Schools. By Louis C. Petersen, No. 2, Vol. IV. of the Normal School Bulletin published at the Southern Illinois State Normal University, Carbondale, Ill.

Isidor Newman Manual Training School. Catalog for 1913-14 with illustrations showing many of the rooms in this attractive school, also some of the finished work in needlework, pottery and woodwork.

An Appreciation of the American Home as a Basis of Public School Art By Ethelwyn Miller and Gertrude Davidson. Series XI, No. 3. Miami University Bulletin, Oxford, Ohio.

The School of Industrial Arts, Trenton, New Jersey. An illustrated catalog showing strong work in several art crafts.

Binder Twine Industry. By the International Harvester Company, Chicago. A beautifully printed and illustrated booklet of forty-eight pages. Articles on fibre and binder twine that have appeared in *The Harvester World.*

Types of Schools for Young Children. A pamphlet issued by The Froebel Society, 4 Bloomsbury Square, London, England. Price, 2d net. Contains an address indicating how the problems raised by Madame Montessori are being solved in England.

VOLUME XV NUMBER 2

MANUAL TRAINING MAGAZINE

DECEMBER, 1913

MANUAL AND VOCATIONAL EDUCATION.

JOHN W. CURTIS.

EDUCATION in its broadest sense begins at the cradle and ends at the grave. That part of an education which may be secured in our public schools is expected to begin with the kindergarten and terminate with liberal university training. In order to provide properly for educating the youth of the land our people organized the schools with the above ideal in mind. They expected each student to adapt himself to the system. Until recently not enough time and thought have been given to adapting the schools to the needs of the people as a whole. We are now coming to view the problem from a different standpoint. We are realizing that the public schools which are supported by the people belong to them and that they must be made to serve all in the most efficient manner possible. We have known for a long time that only a small percentage of those who enter the kindergarten ever finish the university course and that some of those who finish are failures so far as the world's work is concerned. We have known that thousands of healthy vigorous children leave school before they qualify for high school entrance and that many who enter the four year high school leave before completing the course. Many who graduate from the high school never enter the university; hence the result would be discouraging even if all university graduates were highly successful as useful citizens.

Many causes may be contributing to these conditions but one of the most convincing to the average American youth is the belief that it does not pay to continue in school. In some cases we are convinced that it has not paid them to remain in school because the school failed

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to give the opportunity offered elsewhere to prepare for useful service in the community where the student lived.

Since the number of young people who enter the university is so small as compared with the great army who go to their life work without adequate training, I believe the university has guided the high school rather too carefully in preparing candidates for college entrance and that the high school, in truly imitative fashion, has based its entrance requirements upon the supposition that all grammar school students are certain to knock for admission on their way to the university. This arrangement is satisfactory for those who really make the complete journey; but it leaves us the problem of providing for the ninety and four who seek not this higher education and who need in place of it practical education which will qualify them for useful remunerative service and efficient citizenship. In order to solve this problem our most progressive educators have brought into the school some of the activities which thoughtful young people have been seeking elsewhere. We are delighted with the progress of the students who have developed so satisfactorily under the influence of these new opportunities; but we know that even greater results would have been achieved in many communities if the new subjects had received the welcome which they deserved.

In preparing for greater future progress, we may profit by a study of some of the causes which have retarded this work in the past. The reader may know from experience that during the latter half of the nineteenth century there lived in this country some well meaning people who were thinking and teaching in the first half of the eighteenth century. We have always had our share of the world's conservatives whose devotion to ancient standards, thru their respect for the ideals of their educational ancestors, has been the foe of progress, the brother of waste, and the friend of inefficiency.

Educators did not vote unanimously to make manual training an active member in the educational fraternity. Even after it has won its way and has secured recognition as an important branch in our educational system, some of our administrative officers are not burning midnight "standard oil" trying to secure a program which makes its highest success possible. Some school patrons did not, at first, feel the need of a change in our educational program. They seemed to think that what was good for Paul and Silas was good enough for them and their children whether or not the social life of the world

had changed any in the centuries since Paul was persecuted for being a progressive. Some of our most influential teachers who intended being manual training's best friends have really been its worst enemies by claiming for it results which it should not be expected to secure. Manual training may serve as a splendid tonic for such purposes but it

VOCATIONAL GRAMMAR AND HIGH SCHOOL BUILDING, MEMPHIS, TENNESSEE.

should not be recommended as a sure cure for laziness or chronic indifference. It encourages neatness, accuracy, and honesty; but it should not be branded as a failure if it does not convert a sloven moral wreck into a neat useful citizen. Nothing else demonstrates the difference between right and wrong quite so clearly as constructive work which enables the child to discover for himself any errors which he may make. He learns to test the result of his own work and to despise inaccuracy. A lie in wood or iron can be seen. Jacob Riis once said, "When I first saw the Viking Ship, dug out in Norway, a thing which most impressed me was the marks of a lazy carpenter's ax upon the prow of the ship. He had been too lazy to grind his ax and the record was there plain to be seen after a thousand years". Manual training also aids in developing self-reliance in students and causes them to feel that independence which comes from a knowledge of the development of one's creative power.

When the teaching of practical subjects was proposed, some people actually believed that the classical languages disciplined the mind and developed a culture which could be secured in no other way. I find no fault with the ancient lagnuages. We certainly want them continued in our curricula for those who need them; but we have learned that other subjects have a very high cultural value and that they discipline both mind and body and at the same time give practical information. This teaching of practical information has not hurt the classics but it has helped the boys and girls whether or not they have studied either Latin or Greek. I am glad that patient instructors drilled me for a few years in Latin and guided my foot-steps for a while in the mysteries of Greek; but I do not wish to encourage all others to study those subjects just because I gained benefit from them. What others should study depends largely upon what they are preparing to do as a life work.

THE WORK SHOULD BE PUT ON THE RIGHT BASIS.

The majority of school people are coming to see that manual training properly planned and efficiently administered contributes to the success of the curriculum as a whole. As manual training men, it is our privilege to prove that this special work vitalizes the regular subjects. We should see to it that our constructive work really contributes to the success of other subjects instead of expecting the other subjects revised for the convenience of manual training.

In the past manual training teachers have, more or less meekly, accepted the conditions given them and have usually made the best possible use of the time assigned for their subjects. It seems to me that the time has come when adequate equipment, suitable rooms, classes of reasonable size, and ample time for the work should be secured.

Encouraging results are being reported from many quarters but comparatively few cities are providing properly for promoting this important work. Even with the inadequate provision which has existed in most places, manual training has enabled many students to acquaint themselves with several industries and has qualified them to choose more wisely the occupation which they entered as a vocation. In other words, they are being guided in their choice of an occupation rather than being forced to find it by accident or thru wasteful experience with its accompanying tragedies.

Educational experts contend that our schools should be made still more efficient in preparing the youth of the country for citizenship and many are reaching the conclusion that this may be done by devoting more time to subjects which prepare students for entering upon some remunerative pursuit. It is certainly desirable that "our future citizens be better workers and that our future workers be better citizens". All are agreed that every child should become a useful worker and a reliable citizen and many believe that manual training is aiding materially in securing this result. It has afforded a means of stimulating the dormant creative instinct with which most students are endowed and has aided in developing it into creative genius which may be defined as the capacity for hard work or to be composed of 2 per cent inspiration and 98 per cent perspiration. Where given a fair opportunity, it has aided in broadening culture and in strengthening character. It has enriched our schooling, dignified useful toil, and prepared the way for the organization of our modern vocational schools. In fact, manual training has emphasized the need of vocational education. It has rendered genuine service to many but has not met their needs in a vocational way. It has often given good technical skill but in striving for general cultural ends it has ignored, in a large measure, the development of speed in the execution of work. The following concrete example illustrates my point. A young man who had done excellent work in my manual training classes went with me to the country during summer vacation to assist in improving a ranch. He was a faithful, thoughtful worker but he persisted in employing the same accuracy in sawing sheathing for a barn that he had learned in cutting joints in making a writing desk and he exercised the same care in locating post holes for a wire fence that he had learned in locating holes for a game board in the school shop. The result was one of the straightest lines of fence ever constructed but the cost was greatly increased by the time consumed in unnecessary exactness. The present demands of the world are becoming too exacting to approve some of the manual training we have been doing. When a young man leaves school now the world wants to know what he can do, how well he can do it, and how soon he can get it done. Changing conditions make it undesirable that a man know how to do only one thing. This means that we must teach him to do several things intelligently, some one thing well, and that thing with reasonable speed.

MACHINE SEWING—VOCATIONAL GRAMMAR AND HIGH SCHOOL, MEMPHIS, TENNESSEE.

EDUCATIONAL IDEALS IN MEMPHIS.

Twelve or fifteen years ago Memphis possessed what many people considered an excellent school system. The grammar schools prepared the most persistent pupils for the high school and in its turn the high school prepared the faithful few for the university. Those who graduated from the university were well prepared, so far as schooling is concerned, for professional pursuits. In other words, Memphis invited every youth in the city to become a teacher, a lawyer, a doctor or a minister; but she encouraged none to prepare in school for efficient service in her hundreds of factories and thousands of offices.

It seems that the young people in Memphis were no exception to average American boys and girls. They did not complain because the Greeks and Romans used such dreadful languages. They seemed to have believed those ancient people did the best they could in the age in which they lived; but the majority of young Memphians who had no thought of a college career simply dropped out of school at twelve or fourteen and secured employment where they could qualify for efficiency in the local industry which they expected to make their life work. Some of our thoughtful citizens saw this was not best for the industries and that it was very unsatisfactory for the young people.

These citizens and the board of education sought means of inducing a larger number of students to continue longer in school. After the usual prolonged discussion and the uniformly favorable recommendation of successive presidents of the board for six or eight years, they introduced manual training. Of course, the shop was put in a dark basement, and the sewing teacher was supplied with rickety folding chairs, and permitted to use the gymnasium as a classroom when it was not occupied by classes in physical training; but fortunately a reasonably satisfactory equipment was supplied for domestic science. The board was especially fortunate in securing capable teachers whose efficiency compensated, in a large measure, for the lack of adequate equipment. The work was highly successful from the first.

The enrolment in the high school doubled in two years. This evidenced the fact that Memphis needed more skilled workers in her shops, factories, and homes instead of university graduates some of whom were prepared for nothing more than holding down an engineering job tending a peanut roaster. I respect the peanut vendor who sells honest measures at fair prices provided he is unprepared to render

a more useful service to the community; but I think we agree that a man who has received sixteen years of schooling at public expense should make a greater return to society than is possible as a street vendor. He is not a citizen but a parasite if he make an inadequate return to the people for their generosity in providing for his preparation for useful service.

Memphis is not only a southern pioneer in manual training but she is one of the most progressive cities in the entire south. When her citizens had demonstrated the success of the new work in the school instead of being satisfied with their achievement, they were encouraged to strive for still more satisfactory provision for industrial training for the youth of the city. The next step was an attempt to secure a new building for a manual training high school. To make this possible a bond issue had to be authorized by the state assembly.

The legislative committee visited Memphis to determine whether or not her people were becoming too radical in educational matters. They had to be shown why Memphis should sell half a million dollars' worth of bonds to provide for what some of these learned men termed the "frills" in education. The domestic science instructor and her students were ready to aid in convincing these men that Memphis really knew what she wanted. These domestic science people knew the advertising story of the groceryman who said to young house-wives, "Don't argue with your husband. Feed the brute"; so they fed the legislators and convinced them that a domestic science department promises greater happiness in the homes of the city, better health in the community, and better citizens for the state. The bond issue was authorized and the building was constructed.

THE VOCATIONAL GRAMMAR AND HIGH SCHOOL.

At this point our progressive board of education did a thing which in time will mean more to Memphis than any other similar achievement of recent years. This was the organization of a vocational school for both boys and girls. This Vocational Grammar and High School is an integral part of the public school system of the city but it is organized in a separate building. The relation of this school to the ward schools of the city is similar to that borne by the other high school. We believe that a separate school gives better opportunity for successful work than can be secured as a department in a composite high

BENCH AND MACHINE WOODWORKING, VOCATIONAL GRAMMAR AND HIGH SCHOOL, MEMPHIS, TENNESSEE.

school. If a vocational department is organized in the average high school it is so over-shadowed by some of the older, stronger, and unsympathetic departments as to prevent the best results. In other words, the environment of such a department in the average high school is not conducive to its success. The efficient vocational school is possible only when the academic and vocational subjects are properly correlated and when the vocational subjects receive the same consideration from principal and teachers that is granted to each of the traditional subjects of the school. In organizing this school as a unit in the city's educational system, we have tried to provide genuine vocational training for students in grades seven to ten inclusive. This grammar-high-school arrangement insures that continuity of method and practice which is so helpful thru the last two years of the grammar school and the first two years of the high school. This plan has already resulted in greatly increasing the percentage of students who continue in our high school department after completing the eighth grade work. Any student who has completed the work of the sixth grade in a ward school may enter the vocational school where he continues the regular subjects and prepares for useful service in the industries of the city.

We believe that vocational education has a broader meaning than mere trade instruction, hence we are making the course for our first two years very general and then increasing the vocational opportunity in the two high school years. Thruout the course, we strive to make our academic teaching as vital and thoro as possible. We teach spelling in connection with each subject, place especial emphasis on all historical facts of industrial importance, devote less time to place geography and more time and thought to commercial and industrial phases of the subject, and we try to enrich and vitalize our English thruout the four years by correlating it as closely as possible with the vocational subjects. We see no reason for waiting until students pass into the high school to teach them important truths concerning physiology and hygiene, chemistry, physics, sanitation, plant life and animal life, and other matters that prove to be of keen interest to them. They are certainly capable of understanding such things and they need the knowledge which this teaching gives them. We are presenting these subjects in an elementary way in the seventh and eighth grades and then repeating them from a more advanced point of view later in the ninth and tenth grades.

Our enrolment has been larger from the first day than our board of

education expected it to be. We organized with 73 students; during the year the enrolment was increased to 188; and now (near the close of the second year) it is 272. The school, as a whole, has hardly had what should be called an experimental stage because it has rendered a genuine service to the young people of Memphis from the very beginning. During the first year of the school's history more than 20 per cent of our students, basing the estimate upon the gross enrolment, received sufficient special training to enable them to enter fields of increased usefulness. Of course, we include in this 20 per cent only such as have received increased pay as a result of the training received in the vocational school. As far as I have been able to learn, the compensation received by our students has ranged from $5.00 to $12.50 per week. One of our fourteen year old girls, small for her age, entered in grade 7-I when the school was organized. At the end of our first year she finished the seventh grade course and went to clerk during vacation in one of the large department stores of the city. In some way, one of the managers learned that she had studied stenography for a year in the vocational school. When his regular stenographer was absent one day he gave our student a trial and liked her work so well that he continued her in his office thru the summer at $6.00 per week. He gave her to understand that she may return when school closes and receive increased pay.

We are trying to make the school equally helpful to those who expect to become mechanics, those who intend entering commercial pursuits, and that important group who expect to be our city's home-makers. Young men who have been out in the commercial life of the city long enough to appreciate the need of definite training to prepare them for meeting additional responsibilities have entered this school. A still larger number of young women who dropped out before finishing the grammar school course, and some who have finished the regular high school course, have come to us for training in commercial branches and in domestic science and domestic art. These young people are with us for a purpose and, of course, they are doing excellent work. Many of those who entered when the school was organized nearly two years ago are now filling responsible positions in the life of the city. Some of them have married and are telling us of their successful housekeeping which they attribute largely to the training received in the vocational school. Others have accepted positions where they are rendering service as successful stenographers, bookkeepers, etc.

A FLEXIBLE PROGRAM.

Our program provides that one-third of the school day shall be devoted to vocational education by each regular student; but many of our pupils give much more than the regular time to these subjects. Some, who for various reasons are classified as irregular students, devote half of the time to their vocational work; and the postgraduate students are permitted to spend the entire day in the vocational subjects of their choice. In addition to this, we provide for extra work outside school hours in order that ambitious students may make still greater progress. No teacher of a vocational subject offers less than two hours of outside work after school each week and our shop instructor gives his boys the entire forenoon of Saturday each week. This Saturday work has secured excellent results.

We allow irregularity both in the daily program and in hours of attendance when that course seems best for the student in question. We are not endeavoring to prepare any of these young people for college entrance; but we are striving to prepare each of them for a prosperous career and for useful citizenship. In other words, we are trying to adapt the school to the needs of the people instead of having the students adapt themselves to the school. Where students have unusual home duties, we extend to them the service of the school for such part of the day as they find it possible to attend. If a girl must keep house and can be away from home only one-half of each day, we enroll her for the half day. This half-day plan for irregulars is proving highly satisfactory. Some are in school only during the forenoon and others only in the afternoon; but nearly all of our students are full day pupils and the majority of them pursue the regular course including the vocational subject of their choice.

In this vocational school where we are striving to do both intensive and extensive work, we meet some of the same problems which have confronted us in manual training in different parts of the country. Most people are ready to grant that some of the training offered is of very great value from every point of view and that it should be provided at public expense; but occasionally a mother comes in and says, "I want my daughter to study bookkeeping or stenography but I don't want her wasting her time at school studying cooking or sewing. I can teach her those things myself". Since the vocational subject is elective, the mother has the privilege of deciding which one her daughter shall pursue. I usually say the most striking thing at my command in favor

HAND SEWING—VOCATIONAL GRAMMAR AND HIGH SCHOOL, MEMPHIS, TENNESSEE.

of every girl taking both cooking and sewing at some time during the course and then let the matter rest for the time. In several instances I have observed that, during her first semester with us, the daughter has secured the mother's consent for exchanging the commercial work for the home-making course at the beginning of the second semester.

TESTING HOME INSTRUCTION.

Some mothers can teach their daughters to cook and sew but very few do teach them. Of course, our training in homemaking is much broader than sewing and cooking and this makes it doubly attractive to young women. When the mothers really understand what the course embraces, they are usually glad for their daughters to pursue the course even if they are able to learn much concerning these subjects at home. Since these subjects of our course seem to have met with less appreciation than any other branches of the work, I wish to show you how easily the average mother may be mistaken in regard to what her daughter is learning about housekeeping. Not long ago I made an inquiry which secured convincing evidence that our young women from the very best homes really need exactly what our homemaking courses provide. I prepared a list of twenty short practical questions asking for information concerning what our girls knew about domestic science and domestic art before they entered the vocational school. In order that the answers might be tabulated, they were required to be expressed by *yes* or *no*. Ten of the questions sought information concerning the selection and preparation of foods and ten called for information in regard to the testing of fabrics and the making of clothing. Believing that girls who have elected home economics in school are more likely to have shown interest in such work at home than those who have chosen commercial subjects, I selected thirty girls who are studying home economics in order to make the test as fair as possible to home training. I believe you will agree with me that the girl who comes to us and elects cooking and sewing is more likely to have learned something about these subjects at home than the one who elects stenography or bookkeeping declaring that she never could sew and that she never expects to cook a meal.

In regular school classification, the young women who answered the twenty questions ranged from 7-I to high school graduates inclusive, and in age from fourteen to twenty inclusive, their average age being

$16\frac{1}{3}$ years. In order that you may know how well prepared these young women were, at the average age of $16\frac{1}{3}$ years, for assuming the responsibilities of household management, I report a few of the facts shown by the tabulated answers to the twenty questions. Only eleven of the thirty had ever made bread of any kind; seventeen had made candy but only thirteen had ever prepared a complete meal; only eleven of them had canned fruit of any kind, and only three even thought they knew why bread is more healthful after it has cooled thoroly. Fifteen had made attempts at renovating millinery, but only nine had succeeded in trimming a hat; only ten had ever made a garment of underwear, while but two had made a shirt waist; twenty-one had done some of their own mending, but only two knew how to determine whether a piece of cloth is made of cotton or of wool, and one of these is the daughter of a dressmaker. The truth is clearly seen by every one who has made a careful study of the situation. The average girls from the best homes of the land are not receiving such training in the home as is needed to equip them for the position of homemakers which is the assured calling of the majority of American women.

The Memphis Vocational School is giving thoro commercial training to such of our young women as may, for various reasons, wish to engage for a time in commercial pursuits; but, recognizing the supreme need of broadly educated homemakers, we are offering especially rich courses planned to equip girls for the responsibilities of the home. They are being given a thoro knowledge of food principles and the relation of elementary chemistry and bacteriology to the preservation and preparation of foods. They are being taught how to cook for the sick and for the well, for the child and for the adult, for the active and for the sedentary, for the brawn worker and for the brain worker. They are learning how to select and purchase foods without being cheated and how to prepare and serve them without cheating those who do the eating. They are learning that cooking is both a practical art and an applied science. Some of them are also developing an appreciation of the fact that it is usually more remunerative and always far more useful to be a first class cook than to be a second class lawyer, doctor, or teacher. Since every family is to be clothed as well as fed, we are giving liberal instruction in domestic art. Our girls are being trained to select durable appropriate materials. They are learning to make their own clothing as well as the clothing for the other members of their families. They are being taught to design, cut, make, and trim

suits for various occasions. They are learning to renovate millinery and to design, make, and trim hats. These hats compare favorably in appearance with those for sale in the market, they cost much less, and at the same time furnish a fine educational problem in applied art.

Vocational education in its broadest sense is one of the demands of the twentieth century. In addition to the splendid work which our schools have been doing, the vocational school must fill the usually wasted years with rich courses of valuable work and useful study. It must strive to give to every youth such training as will cause him to seek rather than shirk the duties of citizenship. It must reduce poverty by educating for efficiency. It must teach more useful and less useless information.

The Memphis Vocational School is endeavoring to perform its part in this important work. It will have a large part in sending forth boys and girls with good morals and healthy bodies who can read understandingly, speak intelligently, write legibly and forcefully, cipher correctly, and think logically. When it has developed in them self-control, tact, handiness, and the power to work hard and effectively, the commercial, industrial, and home-economic world will be theirs to choose from because their real worth will have but few competitors.

MADE BY FIRST YEAR HIGH SCHOOL BOY, SANTA MONICA, CALIF.
GEORGE G. MORGAN, SUPERVISOR.

A PRACTICAL COMMERCIAL METHOD IN MANUAL TRAINING SHOPS.

THOMAS S. ARMSTRONG.

THERE is a growing tendency to put manual training on a practical commercial basis, at the same time keeping the educational end in view. The plan here presented includes both phases, separating the two entirely, yet uniting them in the final results.

The educational side is carried on thru lectures and recitations, graded on the knowledge acquired and the quality of the work. An hour and a half each week is devoted to this work, the lectures treating of materials, tools, processes, and shop systems, and the recitations following the same lines. Much supplementary reading is required.

The commercial side includes the amount and kind of work, and conduct in the shop, the pupil's standing being estimated on a wage-scale reduced to percentages. This credit counts one-half, the educational credit the other half, the average of the two giving the grade for the monthly report card.

The Manual Training Department is organized into a regular manufacturing establishment, with its offices, shops, and subsidiary divisions.

The office force is composed of the manager and assistant manager of the plant, who are the director of manual training and his assistant. There is also a clerk, who is one of the students. The shop force is made up entirely of students.

One division of the plant is the drafting room, presided over by a superintendent, who is directly responsible for the work in this department. Under his direction is the designing department, presided over by a head designer; a checking department with its head checker; a tracing department with its head tracer; and a blueprint room with its foreman. Each of these heads is responsible for the work done under his supervision.

Another department is the wood shop, supervised by a manager who is assisted by superintendents of each of the different rooms into which it is divided, viz; the bench, machine, stock, finishing and tool rooms.

The workmen in the bench room are divided into groups, the foremen of the groups being responsible for certain jobs. It is the duty of the foreman to issue all orders for stock, to lay out the work for the

ORDER SHEET

MANUAL TRAINING DEPARTMENT

A. B. HESS, Sup't. THOS. S. ARMSTRONG, Director

CROOKSTON HIGH SCHOOL CROOKSTON, MINN. Date 1-30-13

ARTICLE:– Word Rack ORDER No 21

No. of Pieces	T	W	L	Board ft.	MATERIAL	@	COST	
1		9	12	3/4	Paper	2¢	02	
1		9	12	3/4	Tracing cloth	5¢	04	
5		9	12	3 3/4	Blueprint paper	5¢	19	25
4	1/2	2	5	3	Pine			
4	1/4	3/4	5"	1	"			
2	3/4	3/4	18	1	"			
	Total			5	Pine	03	15	
8			1"		Screws		08	
2			3/16"		Screw Eyes		02	
					Stain		10	35
					Waste 25%		15	15

TIME		HRS.	MIN.	@		
Mortimer	Designing	3		07	21	
Watts	Checking		15	10	03	
Getty	Tracing	3		08	24	
Frinke	Printing	1	30	07	10	58
Cornelius	"	1	30	07	10	
M. Johnson	Bench work	9		08	72	
"	Staining	1	30	08	12	
	Expense	19	45	02	40	1 34

Charge to: Supt. Office

Drawing No. 8

Cost		2 67
Profit	25%	67
Price		3 34

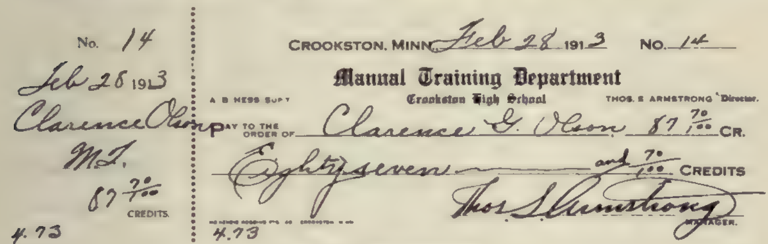
Checked By L. C. Finished 2-14-13 Order No. 21

FIG. 1. ORDER SHEET.

men under him, and to see that this work is done according to specifications.

In the machine room the same system of grouping is carried out, there being a foreman of the lathe-men, foreman of the sawyers, planers, etc.

The superintendent of the stock room issues all stock from orders



No. 14
Feb 28 1913
Clarence Olson
M.T.
87 70/100 CREDITS.
4.73

CROOKSTON, MINN. Feb 28 1913 NO. 14
Manual Training Department
A B HESS SUPT Crookston High School THOS. S ARMSTRONG Director.
PAY TO THE ORDER OF Clarence G. Olson 87 70/100 CR.
Eighty seven and 70/100 CREDITS
Thos S Armstrong MANAGER.
4.73

FIG. 2. CREDIT SLIP.

approved by the manager. It is his duty to keep a record of supplies, and to report all shortages so that the stock may be kept intact. He may or may not have subordinates to assist him, according to the amount of materials handled.

The foreman of the tool room is responsible for all tools under his charge. He checks out and checks in the tools to the workmen, and sees that they are kept in good repair.

This may seem a large number of officers but it must be borne in mind that the inexperience of the boys makes it difficult for any one student to direct many at a time, or to oversee any great amount of work. Thus the groups are purposely kept small, often numbering but three, a foreman and two workmen. This gives the foreman nearly as much time for actual work as his men. However, he is held directly responsible for the amount and quality of work on the particular job entrusted to his group. While the superintendent is responsible for all the work in his department his responsibility is not so great but that he has the larger part of his time for actual bench work. Also these officers are rotated often enough so that all may have a chance to show their executive ability. The boys are shifted from department to department so that they may become familiar with all the work; for instance, in the drafting room a boy may be in the tracing department on one job and in the designing department on the next. Or, in the shop he may for a time be foreman of a bench group, and next in the tool room learning to sharpen tools.

The method of handling the work is that followed in any well-organized manufacturing establishment. All articles made are known as orders, and given a number. These are all received in the office of the General Manager where each is entered on a separate order sheet, Fig. 1, and recorded in the order book. The order sheets follow the

TIME CARD

MANUAL TRAINING DEPARTMENT

CROOKSTON HIGH SCHOOL, CROOKSTON, MINN.

A. B. Hess, Sup't. Thos. S. Armstrong, Director.

NAME Cyrus Cornelius *DATE* 2/26/13

ORDER NO.	WORK DONE	TIME HRS.	TIME MIN.
21	Blue Printing	1	30
13	Detailing Joints		45
	Wage Per Hr. 7¢ *Total*	2	15

FIG. 3. TIME CARD.

work from department to department, being taken care of by the different officers thru whose hands they pass. The officers are responsible for all the entries concerning materials used, names of workmen, etc., which entries are checked and rechecked by the various heads to insure accuracy. When the work is finally completed the order is approved by the manager of the shop and turned over to the office, where the cost of production is figured. After it is approved by the general manager, who all this time with his assistant has been directing the students in their various operations, the order is recorded and placed on file.

The boys as officers and workmen are all placed on a wage schedule, being paid so much per hour. The salary of each pupil is determined by his application, conduct, amount and kind of work produced, and his natural ability. His money value is reduced to a credit system, based on percentages. For example a boy getting five cents an hour working

an hour and a half a day, by the time he has put in thirty full hours, or a month's work, receives $1.50, or 80 per cent. At the end of the month he receives a check payable to himself issued by the Department, which is his monthly commercial standing. This, as above stated, is combined with his educational grade, to give him his monthly report, Fig. 2.

A system of time-cards is used in keeping a record of the time and work done on each order. Every boy is required to hand in a card properly filled out at the end of each session, Fig. 3. These are collected each day, and from them a record of the student's time is kept, and the cost of the production of an article is determined. The clerical work is all done by the student clerk in the office, and as each student serves in this capacity in his turn, all receive valuable clerical training, and become familiar with the entire system.

On the bulletin board is posted the wage schedule, and each Monday morning a list of the students, with the wage of each individual and the time put in the previous week. Everyone is required to do seven and one-half hours per week, and all delinquencies must be made up. Extra credit is given for overtime.

This system as here outlined is now in practical operation and has proven to be eminently satisfactory. Since its introduction the interest of the boys has increased in a marked degree, the output has been materially added to, and the efficiency of the department has doubled.

ENGLISH BREAKFAST SET, DESIGNED AND MADE BY ONE BOY. REPRESENTS ONE-HALF YEAR'S WORK. SANTA MONICA, CALIF. GEORGE G. MORGAN, SUPERVISOR.

DESIGN APPLIED TO NEEDLEWORK.

MARY S. CLAY.

THREE years ago drawing, to the pupils of the Ensley High School, meant copying with pencil or paints from any picture which happened to strike their fancy. But with a new point of view, changes were introduced. Very little copying was allowed, the work being almost entirely drawing from flowers and objects; and later simple design. Drawing was not a "general favorite", being a required subject for the girls. At that time music and drawing were the minor subjects for them. Naturally, those really interested in the work were in the minority, and there was constant "cutting of classes".

Beginning two years ago, the classes were given more design, which was developed in fancy stitching. This proved a most fortunate step; the pupils became interested, and instead of avoiding the classroom, insisted upon spending every vacant period on the new work, until they were literally driven out. First, bags of all varieties were designed; later, sofa pillows, table runners, shirt waists, and other garments were worked out with added interest. So fascinated were the pupils with the work that it was continued by many of them during vacation.

A year later the pupils were divided into two sections, those who really wished to draw, and others who were more apt at handwork. A domestic science department was now added to the school, and necessarily made a change in our plans. The actual carrying out of the designs in the drawing department, could no longer be done in sewing, and the cooperative plan had not yet been tried in our schools.

Crochet was engaging the attention of almost every woman and girl in the community, and there were constant entreaties of, "Please teach us to crochet". We talked of it often and worked up a lively interest. Finally, we were ready to have the first lesson. A five cent spool of thread and steel hook composed our equipment. The arduous task of teaching the girls how to manage their hands was begun. It is difficult to realize how awkward these girls were, since many had never handled a crochet hook and much patience was required for both teacher and pupil.

After a chain could be made properly, a very simple pattern in Filet crochet was attempted. This was drawn on the blackboard for

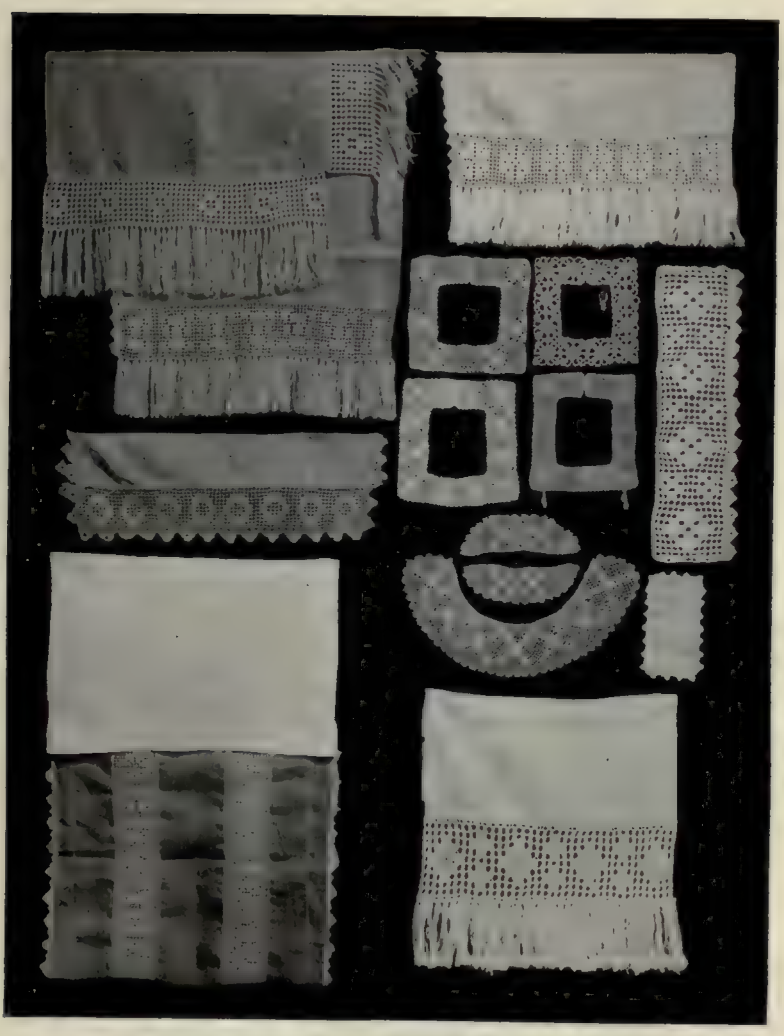


FIG. 1. A PART OF THE ANNUAL EXHIBIT, DESIGN AND NEEDLEWORK, ENSLEY HIGH SCHOOL, BIRMINGHAM, ALABAMA.

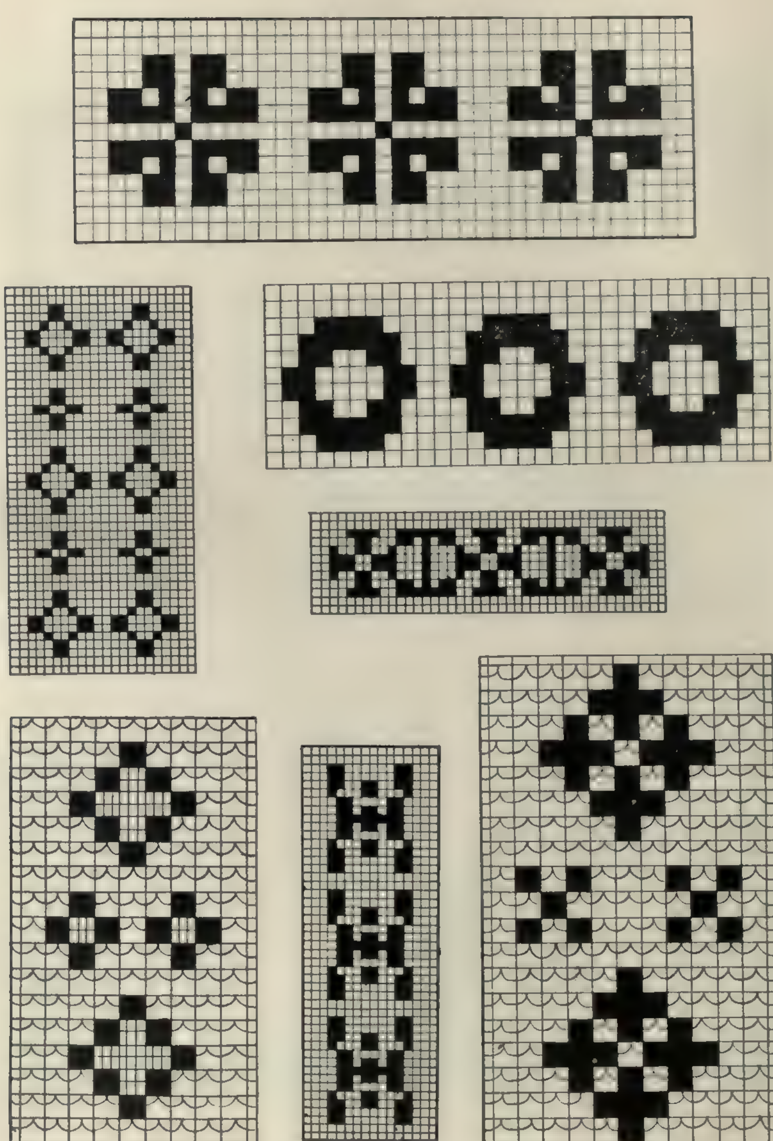


FIG. 2. DECORATIONS FOR TABLE RUNNERS, PIANO COVERS, ETC., DESIGNED AND EXECUTED BY PUPILS IN THE ENSLEY HIGH SCHOOL, BIRMINGHAM, ALA.

all to copy in their note-books, introducing the application of design to squared paper. We used National Note-Book paper, ruling extra lines, making spaces about $\frac{1}{8}''$ square. Limitation of design was necessary in this form of work. Some were quick to learn, while others were very slow, but the main point—*interest*—was gained.

The simple design being satisfactorily completed, more elaborate articles, with original patterns, were made. The thread and hook were now changed to suit the work, and no objections as to the cost of material required were ever raised by either parents or pupils. Each pupil selected the article she wished to make, a scarf for table, dresser, or piano, and then the most suitable material was considered. When the possibilities of this work were realized, many of the girls did not stop at one piece. The classes were sufficiently small to have individual instruction, after the work was started. One of the girls crocheted inserting to trim a dress elaborately, which she herself made, and a large number acquired such proficiency that their work would equal that of a professional.

The next step, the making of medallions, was more advanced. These were made into yokes, collars, and cuffs, and used for trimming waists and dresses. While these pieces were not all of original design, the experience enabled the pupils to originate patterns later. Much ingenuity was required in order to join the medallions and shape pieces correctly. Several of the girls sold their work, which was encouraging.

Figs. 1 and 2 convey a more satisfactory idea of some of the work composing our annual exhibit, which was generally regarded as marking a distinct advance over those of previous years.

A CUPOLA FOR HIGH SCHOOL USE.[1]

C. W. Arlitt.

THE course of study in almost any high school that pretends to have a manual training department of any size usually will include, in the shopwork, the subject of pattern-making. The complaint has sometimes been heard from manual training instructors, that pattern-making does not seem to hold the interest of the students in the same way as the other branches of shopwork. This is probably often due to the fact that the instructor fails to make the proper selection of patterns for his classes. There is danger, it would seem, that sometimes patterns will be required of the class that have no future practical value for the making of molds, and subsequently castings, therefrom. A student does not find interest in making a pattern, only to have it later graded and then finally, perhaps, burned up or disposed of otherwise. But if he can see the practical use of his pattern, whether it be the pattern of something of some service to the school or to himself, it will only help to create a greater interest in his work. Instructors can add enthusiasm to their work in this branch, by carefully selected problems.

The addition of a molding equipment and a cupola for the melting of iron, seems desirable, so that the students can see the practical use of their patterns for the making of molds, and later be able to pour their own metal, in this manner more forcibly appreciating the necessity of observing the reasons for the various essential principles upon which these two professions are founded. The cupola described in this article, Fig. 1, was designed and constructed along the lines of cupolas for commercial service, in a general way at least. Various modifications were made in the plans as at first designed, the necessity of such changes being brought out by various tests, until the final cupola, as shown in the drawings, resulted.

The working principle of an iron cupola may be briefly stated. Cast iron scrap may be melted readily, if it be placed in the presence of a good heat producing material, as coke or coal, and brought to a molten condition by the introduction of a very strong blast of air. The scrap

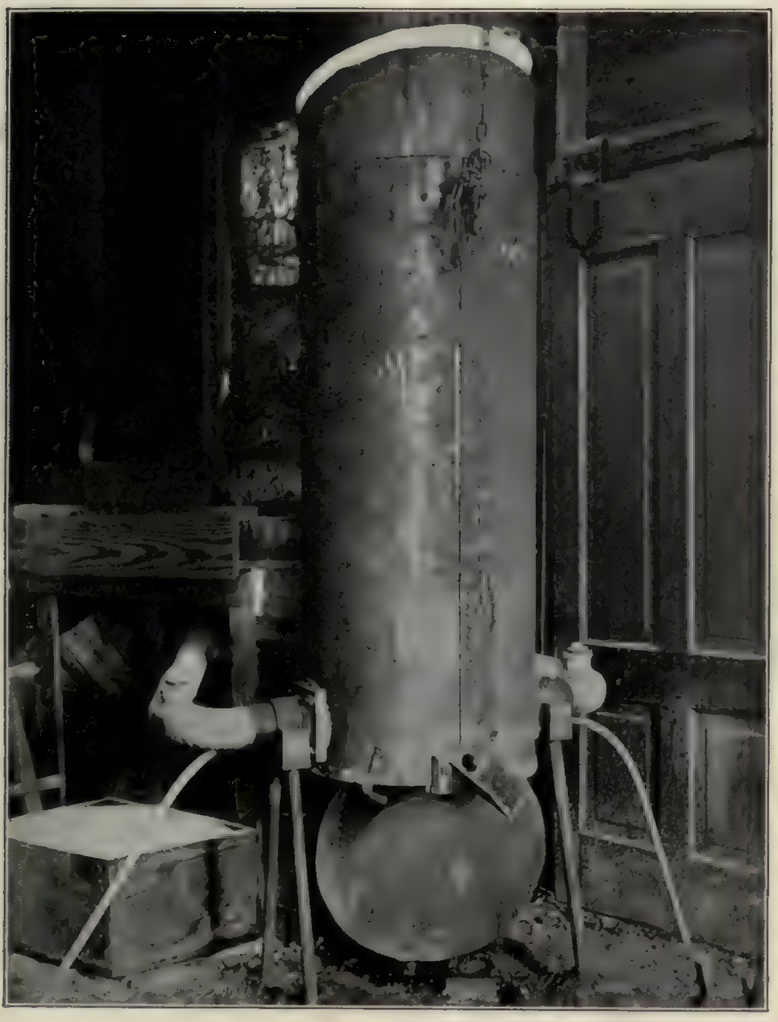


FIG. 1. A CUPOLA FOR HIGH SCHOOL USE.

iron, together with some "pig" iron to make a clean mixture, must be placed in a suitable furnace, or cupola, as it is termed, which must be lined with some very refractory substance, such as fire brick and fire-clay.

The vertical swing principle is essential in a cupola of 24″ or less, inside diameter, to permit cleaning and repairing, since it is almost impossible for a person to work in a space of this size while it stands in a vertical position. Therefore a bearing has been made on each side, which serve for the blast inlets as well. The shell may thus be tilted forward until the top end lies on the ground, from which position the cleaner may readily enter to do his work. The shell is held in the vertical position by means of a trace chain, fastened to the cupola by a hook, the other end of the chain being held to the wall of the shop in the same manner.

The cupola shell consists of a piece of sheet steel, $\frac{3}{16}$″ thick, 24″ inside diameter, and 5 feet long, riveted up one side. See Fig. 2. This shell was found in the stock yard of the Alamo Iron Works, a local firm, which very kindly gave it to the manual training department, indicating their willingness to assist in this phase of education.

Two blast openings or tuyeres, each 4″ in diameter, were cut with a cold chisel in opposite sides, at a distance of 4″ from the bottom of the shell. Half way between these two openings, or in front, a piece 3½″ by 3½″ was cut out, which provides an outlet for the melted iron. Exactly opposite the outlet, at the top of the shell, a piece 9″ by 12″ was removed, thus providing for a charging door. A sheet iron door is hinged on, and bent to fit the curve of the shell, closing the charging opening while a "heat" is being run.

Entirely around the bottom, with the exception of the space cut out for the outlet, a 1½″ by 2″ angle iron was riveted inside the shell, with the 2″ edge projecting at right angles to the shell. This provides a shelf to set the fire brick upon. A spout of "V" shape design is bolted to the shell at the outlet hole, to convey the iron to the ladle. A heavy sheet steel door, ¼″ thick and 25″ in diameter, is hinged at the back of the cupola, so that it may be pulled up and held in place by means of a catch, against the bottom. The catch is located to one side of the spout.

MOUNTING THE CUPOLA.

On each of the tuyere openings mentioned, a heavy casting has been bolted, which is bored out to 4⅝″ diameter, to take a 4″ by 6″ black

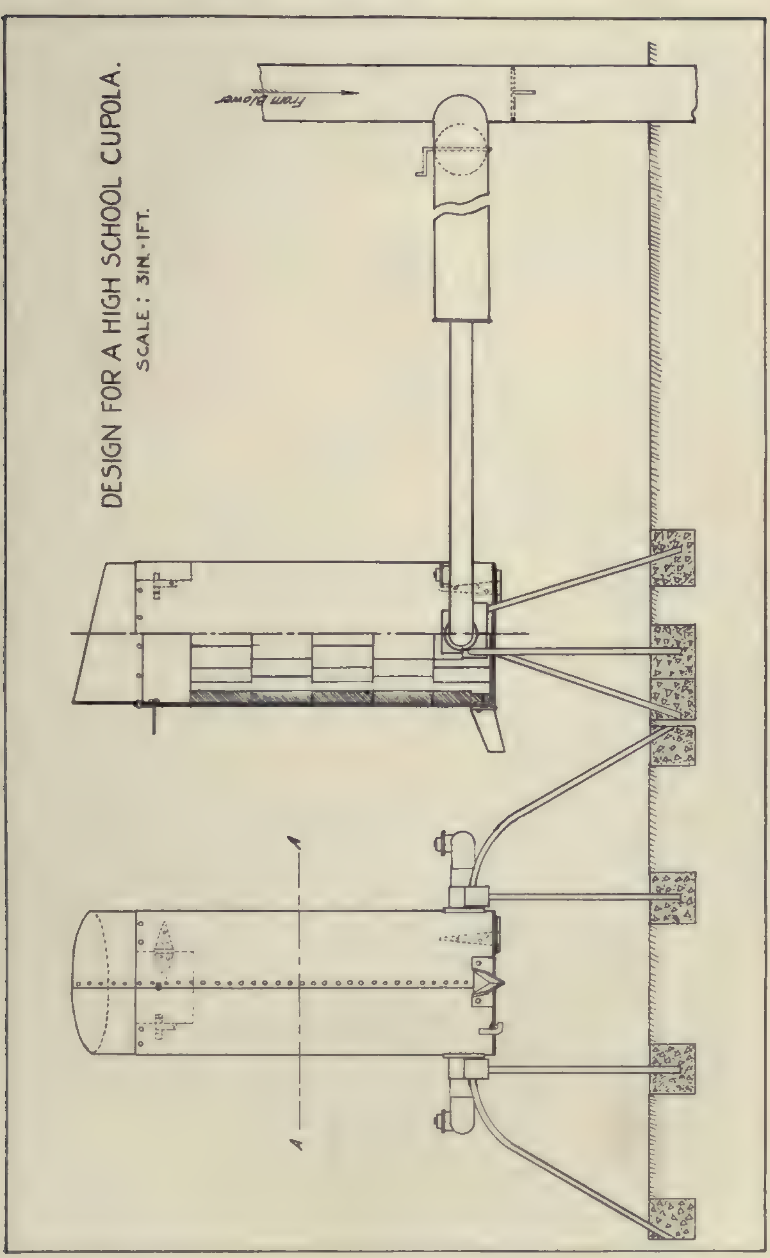


FIG 2.

steel nipple, turned off to make a good fit in the casting. Each of these castings has been made to fit the curve of the shell. See Fig. 3. They are the bearings of the cupola, these bearings resting in two heavy castings, each of which has a semi-circle in it the size of the outside of the bearing. The cast iron pieces containing the semi-circle each have two holes bored out and tapped on the under side, into which pieces of 1″ by 2′ 6″ pipe have been screwed to act as legs for the shell. These legs are set in concrete, as are also the two side braces of ½″ pipe. Reference to the drawing will assist the reader to understand what has been said.

Attention is called to the angle at which the top of the shell is cut, and how the stack has been cut to match this angle. The purpose here is to allow the cupola to tip forward without having the two parts binding on one another, which would be the case if the two cylinders met on a line perpendicular to their length. The stack is made of No. 12 black sheet iron and is hung by means of eye-bolts and guy-rods. It is 6 feet long, which is quite sufficient to carry the heat and gases well out of the shop.

The amount and distribution of the blast in a cupola is of prime importance. Lack of a good blast makes for slow melting and cold iron, sometimes resulting in the loss of a heat and possibly choked ladles. The tuyeres have been placed low in the cupola to produce good, hot iron in the shortest possible time. The fact that they are low prevents the melting of very great quantities of iron at one time, as is required in commercial cupolas, but sufficient iron may gather on the bottom, before it runs into the tuyeres, to make the largest casting that the schools will likely find need to cast.

On a platform, about 8 feet behind the cupola, is a Buffalo "B" Volume Blower No. 4 with downward discharge of 9″ diameter. This was installed to provide the blast for the Buffalo forges of the forge shop. The blower is run at about 2,700 R. P. M. Twelve inches below the discharge outlet of the blower, a "T" joint of galvanized iron, also 9″ diameter, has been placed. In this vertical pipe, as well as in the projecting one, dampers have been placed, so that the entire discharge of the blower may be used at the cupola or for the forges at will. Four feet from the "T" joint the horizontal pipe has been closed and two 4″ galvanized conductor pipes soldered into the end. These two pipes lead to the sides of the shell to the black nipples in the bearings, previously spoken of, thus permitting one pipe and one

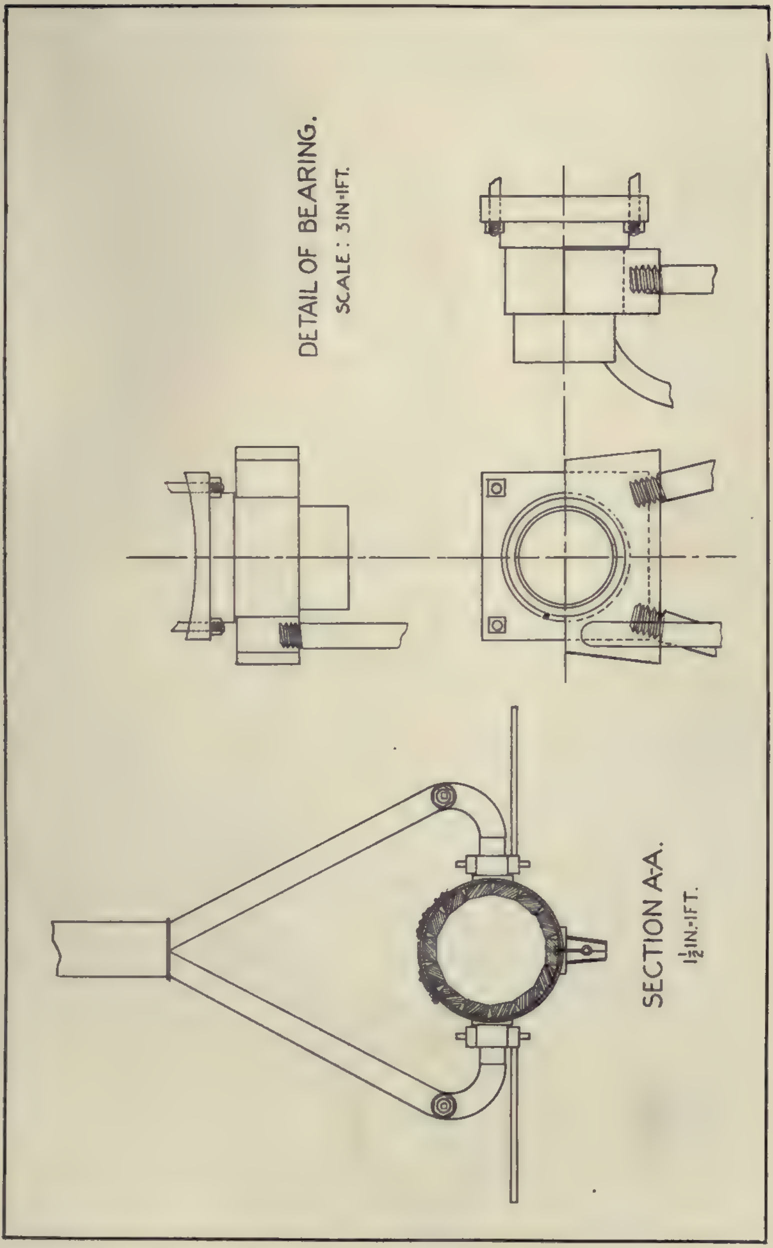


FIG. 3.

nipple to be soldered end to end. Reference to the sketch will illustrate this more clearly. It will be noticed that just outside of each nipple in the galvanized pipe, a 2¼″ bushing with screw plug has been placed. These are to be opened when first lighting the fire, permitting a natural draft to enter each side.

The lining consists of 81 Athens fire brick each 2¼″x4½″x9″ placed on end on the angle iron provided for them. These bricks are packed in carefully, being chipped when necessary, to make a good fit, so that they will not fall out of place when the cupola is tilted. All bricks are set in the best quality fire clay and all holes must be carefully filled with the same material. Thirteen and one-half bricks are needed for each layer.

FIRING AND CHARGING.

The process of firing and charging a cupola needs brief mention. It is often difficult to secure a satisfactory heat, due to oversight of some essential detail. Before placing the fuel for the fire, the steel plate door at the bottom of the shell should be pulled up and secured by means of the catch provided for the purpose. After the door is well secured, the cupola may be tipped forward about a foot, and made fast by means of the chains previously spoken of. Then light cinders, very slightly dampened and of about a waterbucketfull in quantity, are sifted thru a No. 6 sieve and then passed in thru the top. This amount will usually be enough to cover the bottom well. The cinders should be so placed so that there is a slight slope from all points toward the spout opening. A long pole, with a piece of round, flat-faced wood nailed to one end should then be used to tamp the dirt lightly, leaving the surface as regular as possible. Be careful that the cinders are not packed too hard and are used only slightly dampened.

The spout itself, and just inside of the spout on the door of the shell, should be smeared with a paste made of ½ portion best sharp sand and ½ portion best fire clay. Mix dry and then add water to make a thick paste. The ladles for handling the metal should be lined with the same materials. After all the smearing is done, and time has been allowed to dry out somewhat, start a light wood fire on all clayed surfaces keeping it burning until they are well baked.

The cupola may now be drawn up to a vertical position again and made fast, after which a substantial prop, such as a 1″ or 1½″ pipe should be tightly fitted under the middle of the door, with its lower end

resting on a very heavy block of metal or stone, since it would be unwise to depend on the catch alone to resist the weight of the charge in the cupola.

Light shavings, oily waste, or other easily lighted material may now be passed thru the charging door at the back. On this soft kindling should be placed, followed by heavier wood, which should be harder wood. Only enough wood need be used to make a good heavy bed of fire. The plugs in each of the blast pipes should be removed and the spout stopped up with a piece of red clay, after which the fire may be lighted by dropping in a piece of oily waste that has been set afire. A small quantity of kerosene oil poured over the wood will often assist in getting a quick fire. The object in closing the spout is to cause a strong natural draft from each side and thus get the wood well lighted at the sides first. It will spread to the front readily enough.

After the fire is well under way, a bucket of furnace coke is shoveled in thru the charging door, and allowed to burn until it is good and red. When this coke is well kindled, add small quantities at a time until a solid "bed" is burning. It is absolutely necessary that the bed be afire in all places, else the "heat" is liable to be a failure. This bed must be 18″ deep over the top of the tuyeres. Just as soon as the bed is burning nicely, which will require from 45 minutes to an hour, scrap iron and "pig" iron to the amount of 300 or 500 pounds should be thrown on the bed, followed by more coke and then more iron. The proportion of scrap to "pig" iron will depend upon the mixture desired for casting. The plugs in the blast pipes must be screwed in place now and the blast put on. If all details have been carefully attended to, the iron should begin to run in from 7 to 10 minutes. By this time all "hands" should be ready to work.

The first ladle of metal can probably be taken out in 15 minutes after the blast was put on. A sharp pointed tapping bar is used to cut a small hole in the clay forming the stopper in the spout. The weight of the molten metal will be sufficient to wash a clean place after it is started by tapping. The cupola "tender" must stand ready with a "bott stick" having a piece of red clay on its end in the shape of a cone to stop up the opening as soon as the ladle is full. In a reasonable length of time the cupola may be tapped out again, the length of time intervening to be learned by trials. As soon as a ladle is full, it should be carried to the molds and carefully poured. A "skimmer" should go with each pair of ladle carriers to hold back the slag that may float on the metal, using a hooked iron rod for the purpose.

The chief items of expense entering into the construction of the cupola are as follows:

	LENGTH	DIAM.	COST
One stack No. 14 Bl. Iron	6 ft.	24″	$10.00
Guys, Two Trace Chains	4 ft.		.52
One Cupola Shell	5 ft.	24″	Donated
One Blast Pipe with T-joint No. 18 Galv. Iron	6 ft.	9″	8.70
One Bottom door ¼ inch		25″	1.44
Galv. Blast Pipes	8′6″	4″	.85
One Large Hinge			.15
Charging Door, No. 14 Bl. Iron	10″x14″		.42
One Angle Iron	1½″x2″	24″	2.60
All castings, about 60 pounds			2.40
Legs, Four Bl. pipe	26″	1″	.44
100 Fire Brick			3.50
Labor cutting holes in shell			1.40
Bolts			.50
			$32.92

As the shell was donated, its cost is not included in this summary. Such a shell made to order would cost about $12 to $15. Fire clay, sand, tapping bars, ladles and a few smaller items will place the total cost of the cupola up to $70.00.

In conclusion, several of the students should be given credit for the making of the patterns for all castings used in the construction. The drawings for this article were made by one of the boys. It was only thru the voluntary and continued assistance of various boys of the manual training department that the construction, setting up, and testing out was made possible. None of the work interfered with the regular classes. It is now possible to make castings from the boys' patterns for later use in the machine-shop.

Instructors of manual training who may see fit to add a cupola to their equipment will find it desirable to make a more detailed study of the method of charging a cupola and the taking off of a successful heat, by careful reading in reference works. An article of this nature must necessarily be limited in length; the endeavor has been to present only the most essential points involved in the construction and operation.

SUGAR SPOON MADE BY THE FIFTH METHOD.

METALWORK WITH INEXPENSIVE EQUIPMENT FOR THE GRAMMAR GRADES AND HIGH SCHOOLS. XIII.[1]

ARTHUR F. PAYNE.

SPOON-MAKING.

THERE is one problem in art metalwork, spoon-making, that has a distinctive charm of its own. Every worker in metal sooner or later wants to make a spoon. Handmade spoons are invariably of copper or of sterling silver, altho I see no reason why aluminum should not be used in some cases. Copper is usually used for the large nut spoons and silver for all other kinds.

There are five different methods of making spoons, the method varying according to the material used and the use for which the spoon is designed. The first and easiest method is often used in making nut-spoons of copper similar to those shown in the second and third photographs.

A design is first drawn on paper. Both sides should be made exactly alike by folding a piece of paper down the center and drawing one half of the spoon on one side of the center line. Fold the paper and rub the design on the back with some hard object, and the drawing will be transferred to the other side of the center line. Transfer the design onto a piece of 18-gage copper, and cut to the line with the shears, or saw it out with the small saws mentioned in previous articles. Then place the spoon bowl over the hollow in the block of hard wood that was used in making bowls, and with the ball pein hammer beat the spoon bowl into the hollow as smoothly as possible.

The handle if it were left flat would not be stiff enough to serve its purpose, so a ridge is raised down the center of its entire length for the purpose of stiffening it. This is done by laying the handle face downward on a piece of soft wood and using a thin neck hammer to beat up the ridge. This ridge can plainly be seen in the illustration; in the one on the next page it is not defined so sharply, but it may be seen that the narrow shank of the handle is well rounded to give the required stiffness.

NUT-SPOON MADE OF 18-GAGE COPPER, FIRST METHOD. NUT-PICK OF ROUND WIRE.

After the spoon is beaten into shape on the wood it is carefully planished, polished, colored, and waxed as described in previous articles. When using this first method great care must be taken to make the spoon stiff. If this is not done the spoon will bend when used, and there is no greater abomination than an object that is so poorly constructed that it breaks down when put to the use for which it was designed.

The fourth illustration shows a group of copper nut-spoons made by the second method, which is somewhat similar to the first method, the chief difference being that in the second the spoon is sawn out of 15-gage metal. This does away with the necessity for the ridge in the handle, but the spoon is somewhat heavy and feels rather clumsy to handle. The illustration shows an effective means of decoration for nut-spoons, that of saw-piercing a design on the handle or in the bowl. Enamel could also be used to advantage in small designs on the handle, as the cells could readily be etched out in such thick metal.

The third method of spoon-making is used largely in the making of silver teaspoons, and is especially convenient when making spoons with large bowls, similar to the silver soup-spoons shown in the fifth illustration. In this method the spoons are sawn out of a flat piece of 15-gage silver. The spoon is not sawn out full size, but shorter in length, narrower in the bowl, and thicker in the shank, as is shown in the

SALT AND NUT-SPOONS, FIRST METHOD.

PLAIN AND SAW-PIERCED NUT-SPOONS. MADE OF 15-GAGE COPPER, BY THE SECOND METHOD.

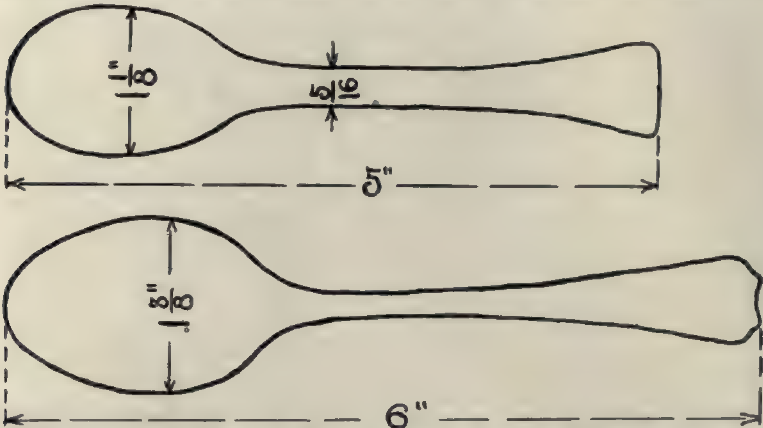
sketch. The larger spoon of the two is the shape of the finished spoon. It is 6″ long, and the bowl is $1\frac{3}{8}$″ wide at the widest part; but when it was sawn out of the flat silver it was 5″ long, and the bowl was $1\frac{1}{8}$″ wide, and the shank was $\frac{5}{16}$″ wide, as shown by the smaller spoon

SILVER SOUP-SPOONS, MADE BY THE THIRD METHOD.

in the sketch. The spoon was beaten and hammered into the desired shape by the use of the ball pein and neck hammers on the flat and round stakes.

The first step is to stretch the bowl wider by hammering on a flat anvil, striking the silver with the hammer held at a slight angle in the direction in which it is desired to make it wider. The method of hammering the bowl is shown in the accompanying sketch, this hammering making the bowl thinner and wider. Next, the spoon is held on

edge, on a rounding convex stake and the shank is hammered narrower with the neck hammer. This will lengthen the spoon and at the same time will make the shank narrower and thicker. The tip of the handle is widened in the same manner as the bowl, and then the spoon will



SPOON-MAKING BY THIRD METHOD. OUTLINES OF SPOONS BEFORE AND AFTER HAMMERING.

have to be annealed, and the process repeated and continued until the spoon is beaten roughly into shape. The rough edges are then filed smooth, and finally the entire spoon is carefully planished.

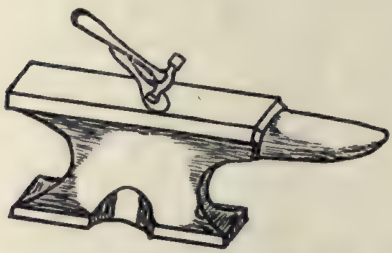
The spoons may be polished by hand or on a lathe; in either case remember the "fire scale", a description of which has been given before. The best course to pursue with silver spoons is as follows: polish all the scratches and file marks out with emery cloth, if the spoon is to be hand polished; or on the felt or leather wheel, with powdered pumice stone, or coarse "tripoli", or oil and emery, if the polishing is done on the lathe. Then anneal the spoon thoroly to bring the fire scale on to the spots where it has been filed or polished off. Next planish the spoon on smooth tools with smooth bright hammers, and polish lightly with a piece of canton flannel with a little red rouge for the final finish.

The fourth method of making a silver spoon is to literally forge it out of a bar of silver. This is the most difficult but is the least expensive of the five methods, as there is less silver wasted. To make a teaspoon 6″ long we shall need a piece of silver 4″ long, $\frac{1}{2}''$ wide, and $\frac{1}{8}''$ thick. The method pursued is exactly that of the blacksmith, the silver being heated almost red hot, and held by a pair of pincers while the bowl is forged out on an anvil. A forty-pound anvil may be bought for $4.00. Its flat polished surface and round horn make it an ideal tool for the

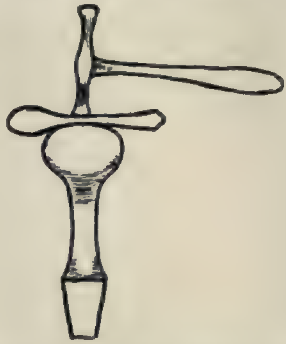
SILVER CHEESE KNIFE, JELLY SPOON, AND TEA SPOONS, HAND-FORGED BY FOURTH METHOD.

spoon-maker, beside being of constant use in many other ways to the art metalworker.

Silver may be forged easier if it is nearly red hot; care must be taken however not to hammer it while it is red hot as it will crack. The bowl should be hammered until it is hard, and then shank and



MAKING THE SPOON BOWL WIDER WITH THE BALL PEIN HAMMER.



MAKING THE SPOON SHANK NARROWER AND THICKER, WITH THE NECK HAMMER

handle; thus saving time by getting the entire spoon hard before annealing a second time. When the spoon is forged roughly to shape, trim it with the shears and file, then planish and polish as described above.

The fifth and last method of making silver spoons is that of cutting the bowl from a piece of 18-gage silver, beating it into shape, and making the handle from a piece of 13-gage silver. The handle of the spoon shown in the illustration, page 123, was made from a piece $3\frac{1}{2}''$ long, $\frac{5}{16}''$ wide, and 13-gage thick. The shank was hammered on the edge until it was square, and the tip hammered out on the flat anvil until it was thinner and wider. This process lengthened the handle to $4\frac{3}{4}''$. After the bowl and handle are soldered together it is necessary to planish the spoon again to make it stiff and hard as the soldering anneals the silver and makes it soft.

The spoon shown illustrates an ideal use of this process of spoon-making. The fact that the spoon and handle are two pieces, soldered together, has been honestly recognized; and, furthermore, it has been emphasized and used as a means of decoration. This is one of the basic principles of good design, and should be kept constantly in mind when working in any material and especially in art metalwork where there are so many opportunities to make use of it.

(*The End.*)

SHOPWORK AND MATHEMATICS FOR GRADE I.[1]

James McKinney and Sarah M. Mott.

III.

THE continuity of the articles on Shopwork and Mathematics in Grade I was somewhat impaired by introducing the making of toys in the October number. While toys may be made at any time during the year, it is usually found that the interest in furnishing house, store, or theater is sustained until the completion of the desired room and, therefore, toys are most frequently made at the close of the year after the larger pieces of work have been completed. This article will return to the playhouses and give some of the furnishings in detail.

The dining-room has a most attractive "homey" look with its well proportioned furniture stained a dark shade. The rugs, curtains, and wall paper harmonize and, while the pupils have a variety of colors from which to choose their decorative scheme, it is a somewhat circumscribed choice. For instance, reds, rather dark blue, and tan are the choices offered for dining-rooms and the furniture is stained oak or mahogany color. Tan, brown, and green are the sitting-room colors with dark green or brown furniture, while the bedrooms have pink, light blue, and yellow figured dimities for hangings and bedspreads, with light rugs and wall paper and white painted furniture. The shops, stables, etc., have no wall paper; the inside and the furniture are painted white. The theaters are papered and the curtains and other furnishings are dark red or green. This harmony in furnishings we hope will carry over into the actual home surroundings and be a help in making selections there. Pictures and other decorations are added sparingly. Simplicity is the keynote of the furnishings.

The sideboard is an interesting little piece of furniture and is constructed as follows:

Stock for Sideboard, Fig. 16.

- Body: $1\frac{1}{2}''$x$2\frac{1}{2}'$x$4''$.
- Back: $\frac{1}{4}''$x$4\frac{1}{2}''$x$4''$.
- False Drawers: $\frac{1}{8}''$x$\frac{3}{4}''$ any length over $2''$.
- False Doors: $\frac{1}{8}''$x$1\frac{1}{2}''$ any length over $2''$.
- Shelf: $\frac{1}{4}''$x$1\frac{1}{4}''$ any length over $4''$.
- Pillars: $\frac{1}{4}''$x$\frac{1}{4}''$ any length over $2''$.

[1] This study was begun in the June, 1913, number.

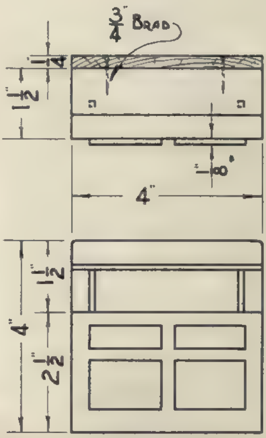


Fig. 16.
Sideboard.

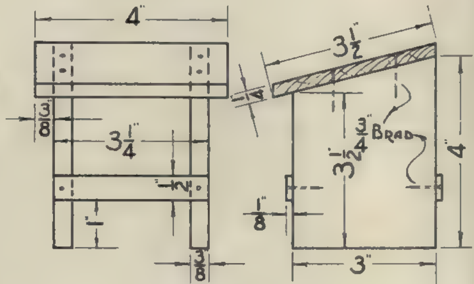


Fig. 17.
Desk.

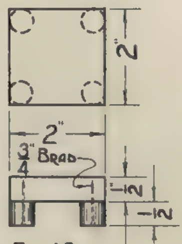


Fig. 18.
Stool.

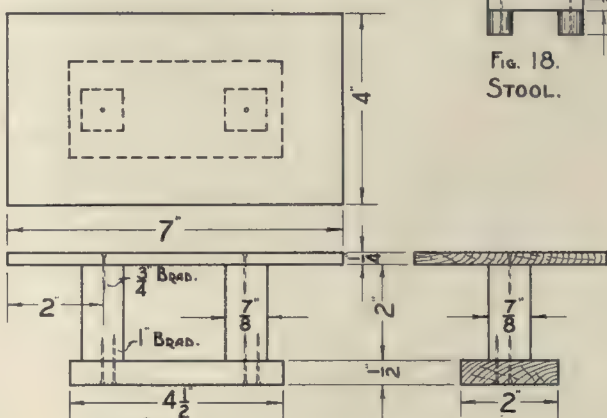


Fig. 19.
Dining Table.

MAKING OF SIDEBOARD.

Body:—The edges of the body block are planed smooth and then the whole block is thoroly smoothed by sandpapering.

Back:—One edge is planed smooth, then measured to width, and planed to size.

Shelf:—A piece 4″ long is cut off from the strip, the sawing being done with the back-saw and bench-hook. It is then measured to 1″ wide and planed to size. (The false doors and drawers are treated in the same manner.)

Assembling:—One nail is entered in the back and driven in part way. The body is now held firmly in the vise and the back nailed on. Before the second nail is put in the final adjusting of the back should be made.

In fixing the shelf, it is best to have a guide line for the nails drawn on the back. The nails should be driven in till the points show thru the back. The shelf is now placed on the nail points and then the nails are driven "home". The pillars can now be cut off to length and nailed on from the top side of the shelf.

If the shelf should seem to be too difficult for some children, it may be left out without altering the appearance of the model very much.

The dining table is oblong and large enough to admit of seating the family of paper dolls at a meal.

Stock for Dining Table, Fig. 19.

Top: $\frac{1}{4}$″x4$\frac{3}{8}$″x7″.

Pillar: $\frac{7}{8}$″x$\frac{7}{8}$″ any length over 2″.

Base: $\frac{1}{2}$″x2$\frac{1}{4}$″ any length over 5″.

The method of making this table is a repetition of the one used in the small table. (Fig. 7.)[2]

Assembling:—To find the position for the nails which fasten the top on to the pillars, a line is drawn 2″ from the edge; two other lines, 2″ from each end are drawn to intersect this middle line; the points of intersection give the placing of the nails. The nails are driven in till the points show thru the top; the pillars are placed on these points and the nails are driven in. The position of the base is found by placing it on the pillars and then adjusting the margin by sighting.

[2] See the June, 1913 number, p. 455.

GRANDFATHER'S CLOCK.

The grandfather's clock which stands in the dining-room is another delight to the small housekeeper and invariably calls to mind the little mouse that ran down as "the clock struck one".

Stock for Clock, Fig. 21.

Body: ⅝"x2¼"x7".
Top: ¼"x1"x any length.
Face: ⅛'x2"x any length.
Base: ⅓"x1½"x any length.

Making of Clock:—One edge of the body is planed smooth, then measured off to width (2") and planed to size.

The length, 6", is then measured off. The sawing is done with the back-saw, the work being held in the bench vise. The pieces for the top, face, and base are planed to width and cut off to length. In sawing these thin pieces the miter box or bench-hook should be used.

Assembling:—The top should be nailed on first, care being taken to make it flush with the back. The face can next be nailed, and then the base. In nailing these thin pieces the brads should not be thicker than No. 19.

PIANO.

The piano gives the distinctive touch to the living room, the tables and chairs of which are among the first furnishings made. These were described in the June number.

Stock for Piano, Fig. 22.

Body: 1"x5½"x6".
Key Board: ¾"x1"x7".

Making of Piano:—In smoothing the body, only the edges should be planed, the remainder of the work being done with sandpaper. The keyboard is planed smooth and cut off to length.

Assembling:—Two 1½" brads are driven thru the keyboard. A pencil line is drawn 2" from edge on the body. The nail points are placed on this line and the nails are driven home.

DESK.

But while most of the little girls have been working away furnishing their rooms, the boys have been equally busy getting their shops in

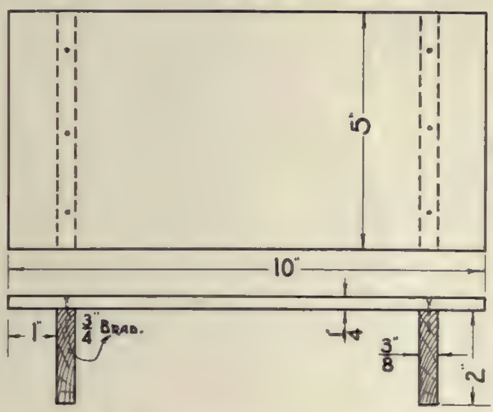


Fig. 20.
Stage for Theatre.

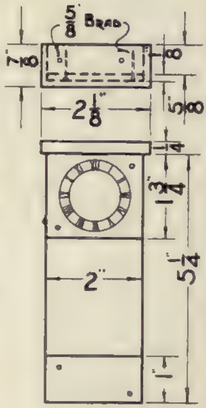


Fig. 21.
Clock.

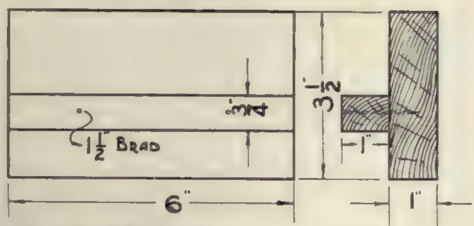


Fig. 22.
Diano.

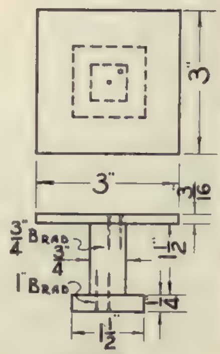


Fig 24.
Table
(For Stage)

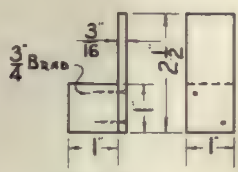


Fig. 23.
Chair.
(For Stage)

order. The desk is most important and furnishes a logical point of departure for the doing of small sums. The counter, piled with its wares of colored clay or its rolls of dry goods, looks quite business like. The paper bags and small baskets, used in storekeeping, are made by the children.

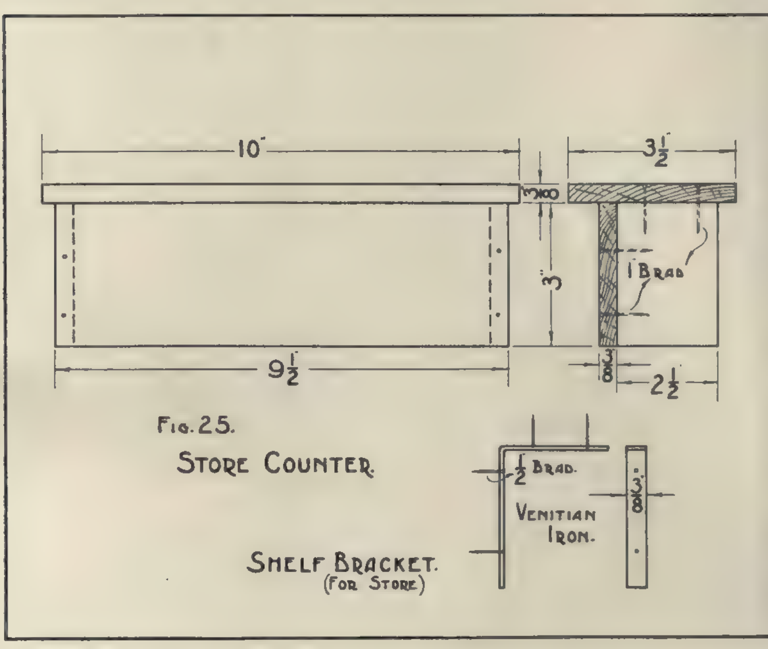


Fig. 25. Store Counter.

Stock for Desk, Fig. 17.

Top: $\frac{1}{4}''$x$3\frac{3}{4}''$x$4''$.

Ends: $\frac{3}{8}''$x$3\frac{1}{4}''$x$7''$.

Rails: $\frac{1}{3}''$x$\frac{1}{2}''$x any length over $4''$.

Making of Desk: Top:—One edge is planed smooth. Then width is measured and planed to size.

Ends:—One edge is planed smooth. Then width is measured and planed to size. To find the bevels, 3″ is measured on one edge and 4″ on the opposite edge; a line is drawn connecting these two points. The saw cut is made along this line, the board being held in the vise.

Rails:—The rails are smoothed by sandpaper and then cut off to length.

Assembling:—A distance of ½″ is measured from each end of the

top and a line is drawn thru each of the points across the board. The nails are entered on this line and driven in till the points show thru. The ends are held in the vise and the top is nailed on. One nail is put in each of the rails.

Stock for Stool, Fig. 18.

$\frac{1}{2}$"x$2\frac{1}{4}$"x any length.

$\frac{1}{2}$" rod of soft wood any length.

Stock for Counter, Fig. 25.

Top: $\frac{3}{8}$"x$3\frac{3}{4}$"x10".

Front: $\frac{3}{8}$"x$3\frac{1}{4}$"x$9\frac{1}{2}$".

Ends: 1"x$2\frac{3}{4}$"x6".

Making of Counter: Top:—One edge is planed smooth. Then width is measured and planed to size. The width of the front and ends is got by the same method. The length of the ends is measured by making two parallel measurements of 3" from one end. The points are connected by a pencil line. The sawing is done with the back-saw, the work being held in the vise.

Assembling:—The front is nailed on to the ends, the ends being held in the vise. The top is laid on the frame and the position of the nails marked with a pencil. It is then placed on the bench and the nails driven in part way. The top is now placed on the frame once more and the nails are driven "home".

THEATER.

One year several children converted their boxes into theaters. The stage and its properties were built; the benches made; the curtains hung, and then the children had great pleasure in dramatizing stories for which they used the small paper dolls made and given them by the Second Grade.

Stock for Stage, Fig. 20.

Floor: $\frac{1}{4}$"x$5\frac{1}{2}$"x10".

Supports: $\frac{3}{8}$"x$2\frac{1}{4}$"x10".

Floor and Supports:—One edge is planed smooth. Then width is measured and planed to size. The supports are measured to length and cut off. The work should be held in the vise during the process of sawing.

Assembling:—The position of the nails going thru the top is found by drawing a line 1" from the end. The nails are driven in till the

points show thru. The support is now held in the vise and the top nailed on.

Stock for Small Chair, Fig. 23.

Seat: 1″x1″x any length over 1″.

Back: $\frac{3}{16}$″x1$\frac{1}{2}$″x any length over 2$\frac{1}{2}$″.

Stock for Small Table, Fig. 24.

Top: $\frac{3}{16}$″x3$\frac{1}{2}$″x3″.

Pillar: $\frac{3}{4}$″x$\frac{3}{4}$″x any length over 1$\frac{1}{2}$″.

Base: $\frac{1}{4}$″x2″x any length over 1$\frac{1}{2}$″.

The method for making and assembling this chair and table is the same as was given for the other table. (See Fig. 6, in the June, 1913, number, p. 155.)

The mathematics so fully outlined in the previous articles goes hand in hand with the work mentioned in the present article. As an increasing number of like articles are finished, the problems increase in difficulty as, for example, the problems given about one or two chairs, tables, etc., are made to apply to five or ten. Sometimes all the chairs made by the entire class are brought together for a lesson, when the problems, given to the class and originated by them, would often cause a grown-up to think. When the pianos are finished, there is an excellent opportunity for the child who likes to deal with large numbers, each piano costing two hundred, five hundred, seven hundred dollars, etc. And when the house is entirely finished and the child wants to put his own value upon it, as he becomes for the time a real estate dealer, then indeed do the figures reach astonishing proportions. Here it is that the child is the leader and the teacher the counsellor. The work is stimulating alike to pupil and teacher and when the days for drill come, as come they must, the child finds a responsive echo in thinking of familiar things which he has made.

(*The End.*)

EDITORIAL

IN our last issue we made a plea for a reasonable amount of time for manual training in the seventh, eighth and high school grades and pointed to the fact that no teacher can do effective work with large classes of pupils coming to him for so small an amount of time as one hour a week. At that time we cited the case of a school where one teacher taught, or made an attempt to teach, 390 different pupils in woodworking per week. Since that time we have received a letter that reveals a worse condition than the one cited. We withhold the names of the cities and of the writer for obvious reasons.

Dear Sir:—

I am taking the liberty of addressing you for the purpose of commending the editorial in the October issue of The Manual Training Magazine on the subject of time given to manual training.

By way of introduction allow me to state that I have been teaching grammar school manual training since 1905. I taught one year in the public schools of A and six and one-half years in B from whence I came to C in September, 1913.

In A and B much the same conditions prevailed as you depict in the editorial. During the time I was in B I never had less than 350 pupils per week from the sixth, seventh and eighth grades and at one time 525 were registered. I emphatically state that no thoro educational end can be served by such an organization and I so stated to the superintendent, but he thot I was trying to shirk.

Where school authorities are so blind and arbitrary it is little wonder that manual training falls into disrepute with practical people who see thru the educational hypocrisy.

The writer of the letter further states that he is glad to know that he is not alone in his conclusions concerning the false economy in teaching woodwork one hour a week.

As stated in our previous article we believe that not less than 2½ hours a week should be given to woodworking whenever it is taught in either the seventh or eighth grade. Perhaps the best allotment of time for these grades is three hours a week divided into two periods of 1½ hours and to have these hours arranged to come on consecutive days. The instruction of the first day will then hold over and become effective the second day. Under such a time schedule one teacher will give

instruction to from 150 to 225 pupils, depending upon whether he teaches three or four periods a day and upon whether he has 20 or 25 pupils in each class. In the city of London each teacher of woodworking has two classes a day, one in the morning for three hours and one in the afternoon for 2½ hours. He has therefore ten classes a week, and there being no more than 20 in a class, his maximum number of pupils is 200. This is enough.

Pre-Vocational Work

An interesting definition of pre-vocational work came out in a discussion at the conference of the city and town superintendents in Indiana on the sixth of November. In discussing the meaning of vocational education Professor Black of the State University defined pre-vocational work as "manual training raised to a higher power". We like this definition because it puts the emphasis where it belongs. There is danger in some quarters that in our enthusiasm for the practical and for factory methods we may go back to the methods of teaching handwork which were in use before the coming of manual training. We have already seen such methods used, and we have heard enthusiastic accounts of methods of teaching elementary woodworking that were tried out and found faulty years ago. There is danger that very poor instruction in handwork may pass inspection under the new term pre-vocational. It has passed and too often continues to pass as manual training because of ignorance and inefficiency. But the term pre-vocational ought to stand for something better. It ought to be "manual training raised to a higher power". It ought to include all the good elements in the best manual training and have added to it new elements which make for speed and practical efficiency. In the pre-vocational work we ought to be especially sure that no habits are learned which must be inhibited at great expenditure of effort as soon as one becomes a workman. On the other hand, this does not mean that in our pre-vocational teaching we must adopt a shop method of teaching. We know better than that today if we are not blind to the manual training experiences of the past forty years. To depend upon shop methods of teaching as they are usually found is to depend upon no method; it is to trust to luck—to repeat the mistakes of a century ago. Even the factories have discovered this and are establishing corporation schools in which good pedagogy is coming to have a more and more important part. We surely want to keep close to the shop methods of *doing* work—close to shop technique—but this

is by no means the same thing as depending upon shop methods of *teaching,* though some are failing to see the difference. The manual training movement has brought forth some methods of teaching handwork which are so fundamental that they cannot reasonably be ignored. And so we say that to speak of pre-vocational work in the manual arts as "manual training raised to a higher power" is to place the emphasis where it belongs; namely on manual training and on a higher type of manual training. —C. A. B.

A Prize Competition

We are desirous of stimulating a more active, critical interest in the kinds of projects used in giving instruction in manual training, and on that account we are announcing in the advertising pages of this issue a prize competition which we hope will interest every reader. We hope that this method of calling out problems for comparative study will meet with approval. If we can have a general response to this offer we believe every reader will benefit by it. We want to hear from beginners in teaching as well as men who have spent years in the service.

ASSOCIATIONS

PITTSBURGH.

One of the most attractive annual programs issued by the organizations familiar to readers of this Department is the "Year Book of the Manual Arts Association of Allegheny County, Pennsylvania." This 20-page booklet contains a directory of the officers and committees of the Association, the program for the year, the Constitution and By-Laws, and a list of the names and addresses of members.

The program includes the following: October, a social meeting; November, reports on the International Congress of Hygiene, and the meeting of the National Council on Industrial Safety, by the president of the Association, Dean C. B. Connelley, Carnegie Technical Schools; December, reports of the delegates to University Work, Miss Edna T. Mitchell, instructor in household economy, Liberty Manual Training School, and Miss Alice D. Fairman, instructor in domestic art, Peabody High School; January, Industrial Education: Industrial Background, and Kind of School, by E. H. Bartholomew, instructor in manual training, South High School: reports of delegates to University Work, by Joseph M. Speer, supervisor of manual training, north side and south side districts, and John T. Hawthorne, supervisor for east end and central districts; February, Vocational Guidance, by O. W. Burroughs, director of vocational guidance, Pittsburgh public schools; March, Essential Sociological Qualifications for Good Citizenship, by Dr. Roswell P. Johnson, University of Pittsburgh; April, Some Fundamental Factors in Manual Arts Training, Dr. H. B. Davis, principal, Pittsburgh Teachers' Training School. The Association year closes in May with a social meeting under the direction of a special committee appointed by the president. The annual business meeting, with election of officers and committees, also occurs in connection with the May meeting.

BOSTON MANUAL TRAINING CLUB.

The Club purposes this winter to bring out a committee report hinting at a flexible course of study in manual training for the grades. This report will deal with the subject in a broad way from the standpoint of the boy rather than the work attempted. It is hoped that it may be made available for general distribution thru its publication by some agency that will give it a wide circulation.

The winter's program always includes two or more trips to the social camp owned by the Club on the Concord River at Billerica, a "get-together" dinner at some hotel, several meetings for round table discussion of special problems by members of the Club, and meetings arranged for the purpose of hearing well-known speakers from other cities.

NATIONAL SOCIETY FOR THE PROMOTION OF INDUSTRIAL EDUCATION.

The seventh annual convention of the National Society for the Promotion of Industrial Education, held in Grand Rapids, Michigan, October 23-25, was a success in every way, the audiences being the largest the Society has ever known. The schools were closed on Thursday and Friday and the teachers attended the sessions in large numbers.

The Friday afternoon session, devoted to a consideration of vocational education of girls and women, was the climax of the convention. The spacious auditorium of the Fountain Street Baptist Church was crowded to the doors, and many persons were unable to gain admission. Mrs. William F. McKnight, former president of the Ladies' Literary Club, Grand Rapids, presided, and the following addresses were given: "What Industrial Training Should We Give the Average Girl?" Miss Ida M. Tarbell, Associate Editor, "American Magazine;" "The Place of Home Making in Industrial Education for Girls," Mrs. Eva White, Agent for Vocational Education, Massachusetts State Board of Education; "What the National Society is Planning to do for the Vocational Training of Girls and Women," Miss Cleo Murtland, Assistant Secretary, National Society for the Promotion of Industrial Education.

Three important contributions were made by the Society at this convention in the form of Bulletins published: 1. "The Short Unit Course for Trade Extension and Part-Time Trade Extension Schools," by Wesley A. O'Leary, in collaboration with Secretary C. A. Prosser; 2. "Report of the Committee on the Selection and Training of Teachers for State Aided Industrial Schools for Boys and Men," A. Lincoln Filene, Chairman; 3. "What Chambers of Commerce Can Do for Vocational Education," by Alvin E. Dodd, with the collaboration of Secretary Prosser. These reports will repay careful study.

Two other addresses attracted special attention, Professor Dewey's analysis of the question of "unit" versus "dual" control of vocational schools, and Professor Richards' statement of the principles that should guide in the study of an industry for purposes of vocational education and vocational guidance. Lack of space prevents a more adequate account of the convention.

At the business session on Saturday morning President Redfield was reelected, as were also the outgoing members of the Board of Managers with two exceptions. The reports of officers and committees presented indicate that the office of the secretary of the Society is a veritable hive of industry.

NATIONAL VOCATIONAL GUIDANCE ASSOCIATION.

Three days earlier in the same week with the convention of the National Society there was held a Vocational Guidance Conference, October 21-23, at Grand Rapids, which resulted in the organization of a National Vocational Guidance Association. Five sessions were held, with a splendid array of papers and addresses and enthusiastic audiences.

The officers of the new organization are: president, Frank M. Leavitt, University of Chicago; vice-president, Miss Alice P. Barrows, director of the vocational education survey, New York, N. Y.; secretary, Jesse B. Davis, principal, Central High School, Grand Rapids, Michigan; treasurer, James S. Hiatt, secretary, Public Education Association, Philadelphia. Five members were elected to serve with the officers as an executive council. It was voted to place the membership dues at $1 per year.

At a meeting of the executive council on Friday evening important policies were shaped, and plans laid for aggressive work during the year. It was decided to designate VOCATIONAL EDUCATION, published by the Manual Arts Press, Peoria, Illinois, as the official organ of the Association.

THE SCHOOL CRAFTS CLUB.

The executive committee of the Club held its first meeting of the year on September 26th, and decided to devote the first part of the year's work to an intensive and firsthand study of certain technical and trade schools in New York and vicinity, giving part of the time also to art interests.

The first step in this direction has been made possible thru the kindness of Frank E. Mathewson, a member, who has invited the Club to hold one of its meetings at the Dickinson High School, Jersey City. This is one of the most progressive high schools of the kind in the east, and an exceptional opportunity will be given the members to visit the school while it is in full operation.

Another school to be visited will probably be Pratt Institute, Brooklyn, tho this has not yet been definitely settled.

The first regular meeting of the Club was held on Friday evening, November 14th, at which time the members were presented with a booklet containing a copy of the ex-president's letter, marking the close of the first decade of the Club's existence; the revised Constitution and By-Laws; list of members; and a retrospect of last year's work. The committee in charge of the publication consisted of the officers of last year, president, William F. Vroom; vice-president, Morris Greenberg; and secretary, Charles W. Ledley.

—The Publicity Committee.

AMERICAN SOCIETY OF ENGINEER DRAFTSMEN.

During the past year the Society has increased its membership over 100 per cent, and a number of important committees have been at work, as follows:

Research: This committee has been entrusted with the work of getting together a set of standard cross-sections which will meet all requirements, and also the task of compiling and publishing a set of suitable data sheets.

Publication: This committee was directed by the Board of Governors to publish a Journal of the Society, which has been accomplished, the first number appearing in September, 1913. This committee has also done valuable work in editing papers prior to publication.

Employment: This committee, thru a Department of Employment, has been particularly active in securing positions for members, and has been of special

benefit to employers who, hitherto, have been compelled to hunt thru piles of advertisements or else trust to the tender mercies of agencies.

Meetings: Assisted by the president, this committee has secured lectures and papers from members for the monthly meetings, and also has purchased a stereopticon for use in illustrating the same.

—Walter M. Smyth, Secretary,
74 Cortlandt St., New York, N. Y.

NEW HAMPSHIRE MANUAL TRAINING CLUB.

A meeting of manual training teachers was held at the Parker school, Concord, New Hampshire, on October 17th, 1913, for the purpose of considering the organization of a state manual training association. Eleven men were present, and after full discussion it was decided to organize "The New Hampshire Manual Training Club." This was done, and the following officers elected: President, F. E. Browne, Manchester; vice-president, E. W. Beck, Nashua; secretary-treasurer, A. W. French, Concord. A committee was appointed to draw up the details of organization, including Constitution and By-Laws, and to prepare a report for a future meeting.

—Raymond P. Gilman, Secretary, *pro tem.*

The fifth annual meeting of the Drawing Section of the New Hampshire State Teachers' Association was held at Concord, October 17th, 1913. The newly elected officers are: president, Arthur W. French, Concord; secretary-treasurer, Charles M. Curl, Manchester. Exhibits from a large number of cities were displayed, including work in pencil, crayon, water color, and pen and ink, from all grades of the elementary schools, and from high schools and manual training schools.

MAINE TEACHERS' ASSOCIATION.

The Maine Teachers' Association held its twelfth annual meeting at Bangor, October 30, 31, 1913. The program provided for fifteen separate departments, in addition to other organizations meeting at the same time and place. One of the topics on the program of the Department of Libraries was "Books for Vocational Training," by Miss M. G. Fickett, of the Western State Normal School.

The program of the Department of Manual Training and Drawing included the following topics and speakers: "Vocational Guidance as a Phase of Manual Training Work," E. H. Harlacher, Gorham; "Things to do in Paper and Cardboard Construction," Miss Gertrude Morrell, Aroostook State Normal School, Presque Isle; "Why Drafting in the High School?," W. S. Arnold, Bangor; "An Office Built by the Boys," Ernest Curley, Lewiston; "A Shop Built by the Boys," C. G. Wheeler, Brunswick; "Electric Wiring as a High School Project," G. A. Brown, Western State Normal School, Gorham.

In the Department of Home Economics the following topics were discussed: "Industrial Education," W. G. Mallett, principal, Farmington State Normal School; "The School Luncheon," Miss Mary S. Coombs, Eastern State Normal School, Castine; "Science in the Practice of Home Economics," Professor S. C. W. Easley, University of Maine; "Progress of Home Economics in Maine," State Superintendent Payson Smith; "Methods in Teaching Domestic Science," Miss Mary Byrne, Brunswick.

MINNESOTA EDUCATIONAL ASSOCIATION.

One of the largest and most beneficial meetings of the Manual Training Division of the Minnesota Educational Association was held at Minneapolis, October 22 to 25, 1913. About 150 manual training men met to discuss the current topics in their line of work.

The program was arranged by George M. Brace of St. Paul, president of the Manual Training Division, and it was perhaps the best program ever given before the Association. Several speakers of wide reputation addressed the meeting, the program including the following topics and speakers:

"Furniture Designs for High School Manual Training," H. J. Scharr, Virginia; "The Best Books on Manual Training," Mr. Cooper, Mankato; "Equipment for Manual Training in Rural Schools," Mr. Davis, International Falls; "Working Drawings for Grades," Mr. Pfeiffer, St. Paul;" Manual Training for Agricultural Schools," Mr. Knox, Medford; "Manual Training for (1) the Wage Earner, (2) as a Cultural Subject," Supt. R. E. Denfeld, Duluth; "The Manual Training Teacher," Pres. L. D. Harvey, Stout Institute, Menomonie, Wis.

It was voted by the Association to hold a special meeting in the spring to exhibit the work of the state and to discuss its progress. Two meetings were held, one on Thursday p. m., and one on Friday p. m., concluding with an informal banquet of the manual training men.

RANGE MANUAL ARTS ASSOCIATION.

On September 20, 1913, the manual training teachers of the Iron Ranges of Northern Minnesota met and formed an Association for the purpose of studying conditions prevailing in this section and to cooperate with other similar Associations and with the practical and other school men of the community. The Association has members from about 20 towns and cities and a membership of about 30.

The Association held its first meeting at Virginia, Minn., at which a program was given and the election of officers as follows: president, H. J. Scharr, Virginia, Minn.; vice-president, R. W. Jackson, Chisholm, Minn.; Secretary and Treasurer, M. B. Elson, Gilbert, Minn.

The members present visited the largest pine saw mill in the world, located in Virginia, after which they were banqueted by the Domestic Science Department as guests of the Board of Education.

The next meeting will be held at Hibbing, Minn., November 15, 1913.

COLLEGE ART ASSOCIATION.

The College Art Association will hold its third annual meeting in Chicago, on the 29th and 30th of December, in the Harper Memorial Library building of the University of Chicago. Over fifty colleges and universities are represented in this association, which aims to promote and standardize efficient instruction in the fine arts in American institutions of higher education. The committee on courses of study will make important reports at the Chicago meeting. Holmes Smith, of Washington University, St. Louis, is president of the association and C. F. Kelley, of the University of Illinois, is secretary.

ASSOCIATION OF INDIANA INDUSTRIAL TEACHERS.

The Association of Indiana Industrial Teachers was organized at the December, 1912, meeting of the Indiana State Teachers Association. Its second meeting was held at Gary, October 31st and November 1st. The program included the following speakers and subjects: F. D. Crawshaw, Manual Arts for Vocational Ends; H. I. Wilhite, Logansport, Shop and Drawing Work in the Seventh and Eighth Grades; H. M. Appleman, South Bend, Incidental Teachings in the Shop; Harry E. Wood, Indianapolis, Semi-Industrial Work in the Grammar Grades; G. E. Wulfing, Gary, The Purpose and Plan of the Gary Public Schools.

The officers of the association are M. L. Laubach, Terre Haute,, president, C. F. Wintersteen, Hartford City, secretary, and Paul Covert, Indianapolis High School, vice-president.

The convention of the National Society for the Promotion of Industrial Education at Grand Rapids, October 23-25, provided opportunities for the executive committees of several Associations to meet for the purpose of discussing plans and policies for the year, and to lay out programs. Among the Associations that were able to transact important business in this way were: the Michigan Industrial Arts and Science Association, the Wisconsin School Arts and Home Economics Association, and the Illinois Manual Arts Association.

The Cleveland, Ohio, Manual Training Club has been making a careful study of the various manual training and industrial schools in its section of the state. Corporation schools, Y. M. C. A. schools, and public schools have been investigated. The Club proposes also to take up a study of the advisibility of introducing elementary industrial schools as a means of retaining more pupils in school.

The New York State Teachers' Association held its annual convention in Syracuse, November 25th. The Art, Manual Training, and Home Economics Sections have united to form a stronger organization, under the name Manual Arts Section. The principal address at the combined session was given by Professor Dexter S. Kimball, Sibley College, Cornell University, on "Function

as a Factor in Design." In the afternoon three divisional round tables were held, with the following leaders of discussion: Vocational and Manual Training, Lewis H. Wilson, State Education Department, Albany, N. Y.; Art Education, Miss Matilda Miett, supervisor of drawing, Syracuse; Home Economics, Miss Elizabeth Lange, State Normal School, Buffalo.

The California Teachers' Association of Manual Arts has been discontinued as a separate organization, its place being taken by a number of smaller Associations.

The Buffalo, New York, Manual Arts Association plans a series of five special meetings for the year, one to be devoted to each of the several lines of work represented in the membership. The first meeting, held in October, was a social evening. The second is to be devoted to a discussion of the problems of vocational and technical training. The third meeting will consider topics related to manual training; the fourth, domestic science and domestic art; and the fifth, art and music. A vigorous campaign is being waged by the membership committee to enlist the interest and active support of everybody in the city connected with the various arts and crafts.

The Connecticut Manual Arts Teachers' Association holds two meetings each year, in October and April, the program consisting of a general session, and sections devoted to shopwork and art interests, respectively.

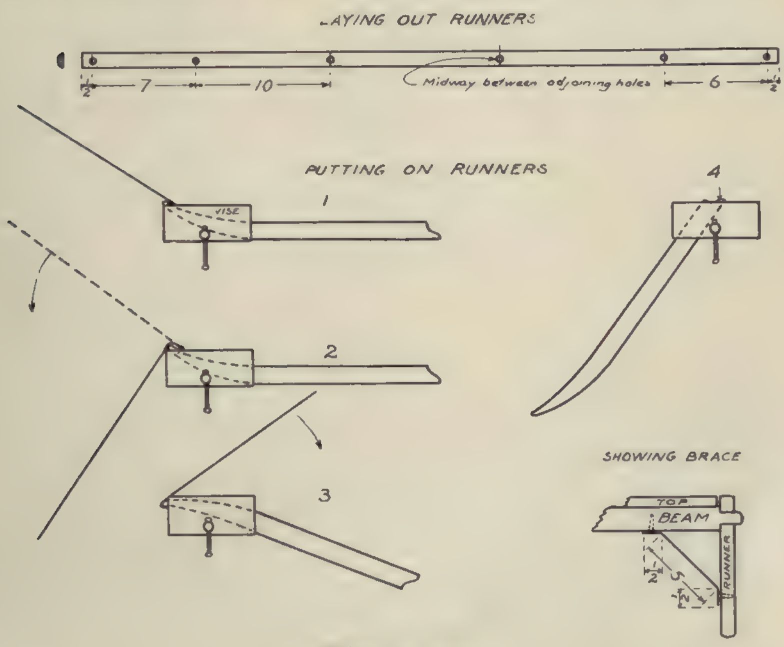
The Kansas Manual Arts Association has two important committees at work in preparation for reports and discussion at the next meeting. One committee is making a study of "Uniform Courses of Study in Mechanical Drawing," and the other "A Course of Study in Woodwork for the Grades." One of the topics for discussion at this meeting is to be "The Importance of Exhibits: How to Prepare and Use Them."

SHOP PROBLEMS

GEORGE A. SEATON, Editor.

SLED.

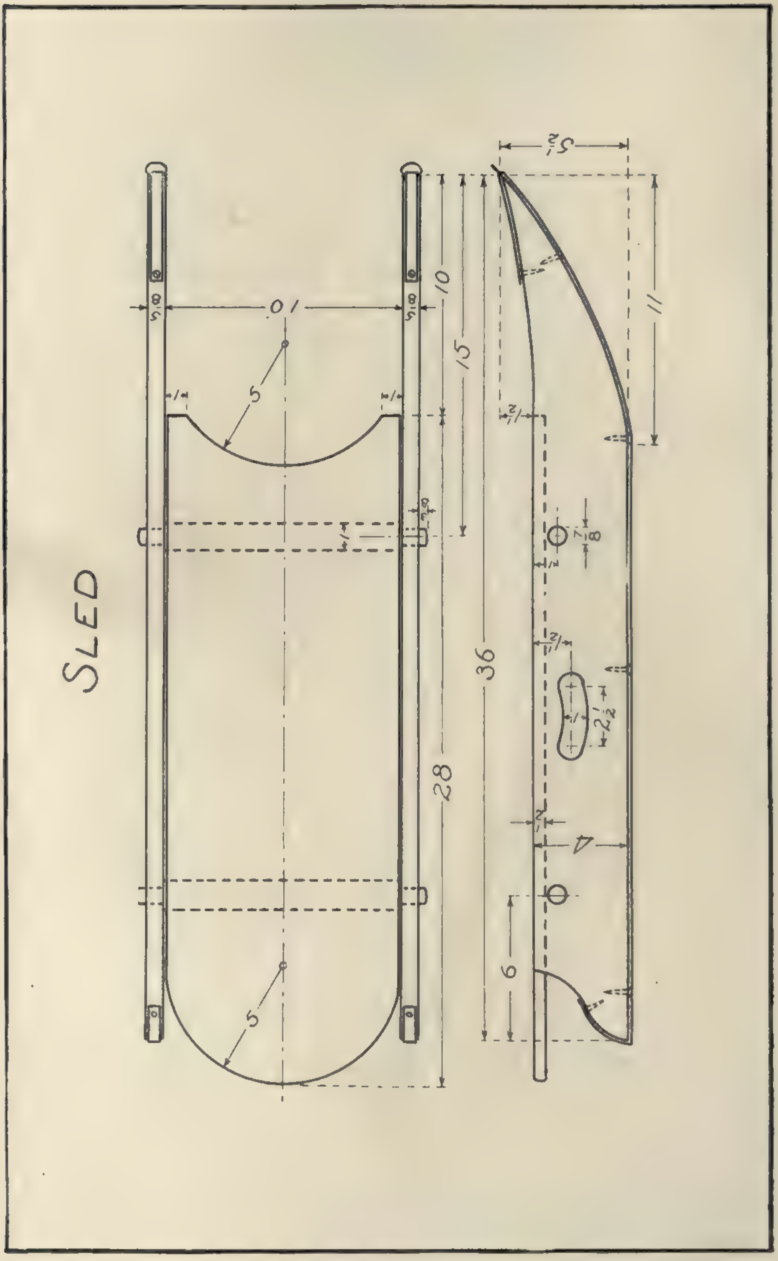
A problem that can well be undertaken in any region of winter snows is the sled shown in the drawing of C. M. Williams of Elyria. From 90 to 100 of these sleds have been made under Mr. Williams' direction each year for the past seven years and the needs of the town do not yet seem to be supplied.

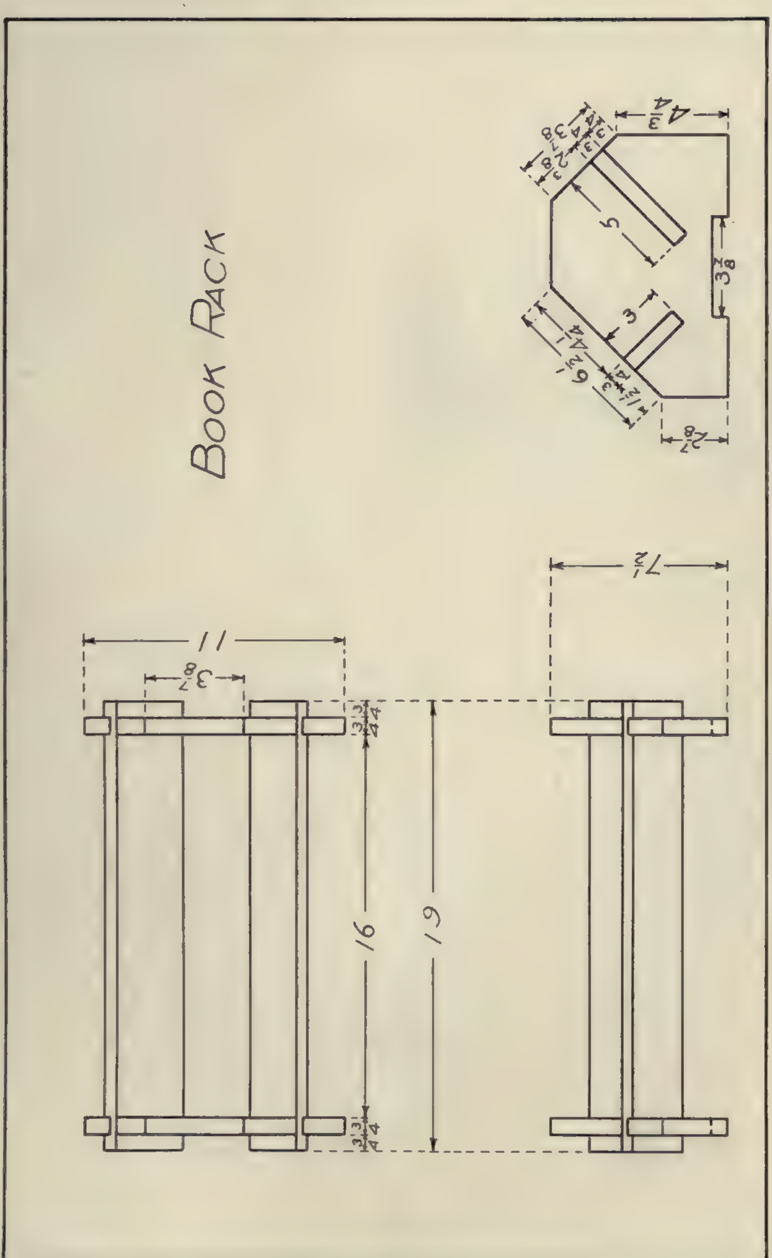


DETAILS OF SLED.

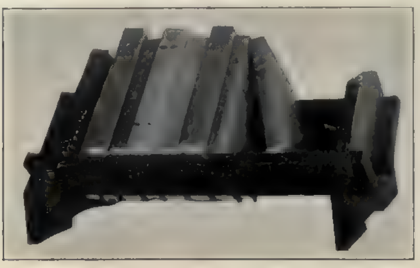
The runners are made from white ash ⅝ by 5½ inches, the top of yellow poplar and the crossbeams of white ash, oak or any hard wood 1 by 1 inch. The ends of these beams are finished round with a hollow auger. Each cross beam is braced with a strip of the runner iron bent and attached as shown in the sketch.

The runner irons are made from ½ inch half oval strips and are 3 feet 9 inches long for a 3-foot sled, 4 feet 3 inches long for a 3½-foot sled and 4 feet 9 inches long for a 4-foot sled. They are all to be drilled as shown in the sketch, the third hole from the right being placed half way between the two adjacent holes, a distance which will vary with the length of the sled.


SLED
10
15
28
36
11
5
5
6
4


BOOK RACK
11
16
19
5
3

The method of applying the runner irons is suggested in four sketches. The runner is first placed in the vise with its top edge flush with the top of the vise and the end of the runner near the corner of the vise. The first screw is then put in place as shown in Fig. 1. Care must be taken not to have the wood extend above the vise or it will split when the screw is driven in. The iron is next grasped near the wood and bent as shown in Fig. 2. The runner's position in the vise is now reversed and the bending continued as indicated in Fig 3, while all the screws are placed except the one at the rear end, continual care being exercised to keep the wood flush with the top of the vise. The rear end of the runner is finally placed in the vise as shown in Fig 4, the iron is bent around the end with a hammer and the last screw driven home.



BOOK RACK.

BOOK RACK.

Of the making of book racks there is no end, yet the one shown in the photograph is out of the usual run and is surely quite attractive. The design is by W. E. Hackett, Reading, Pennsylvania.

SERVING TABLE.

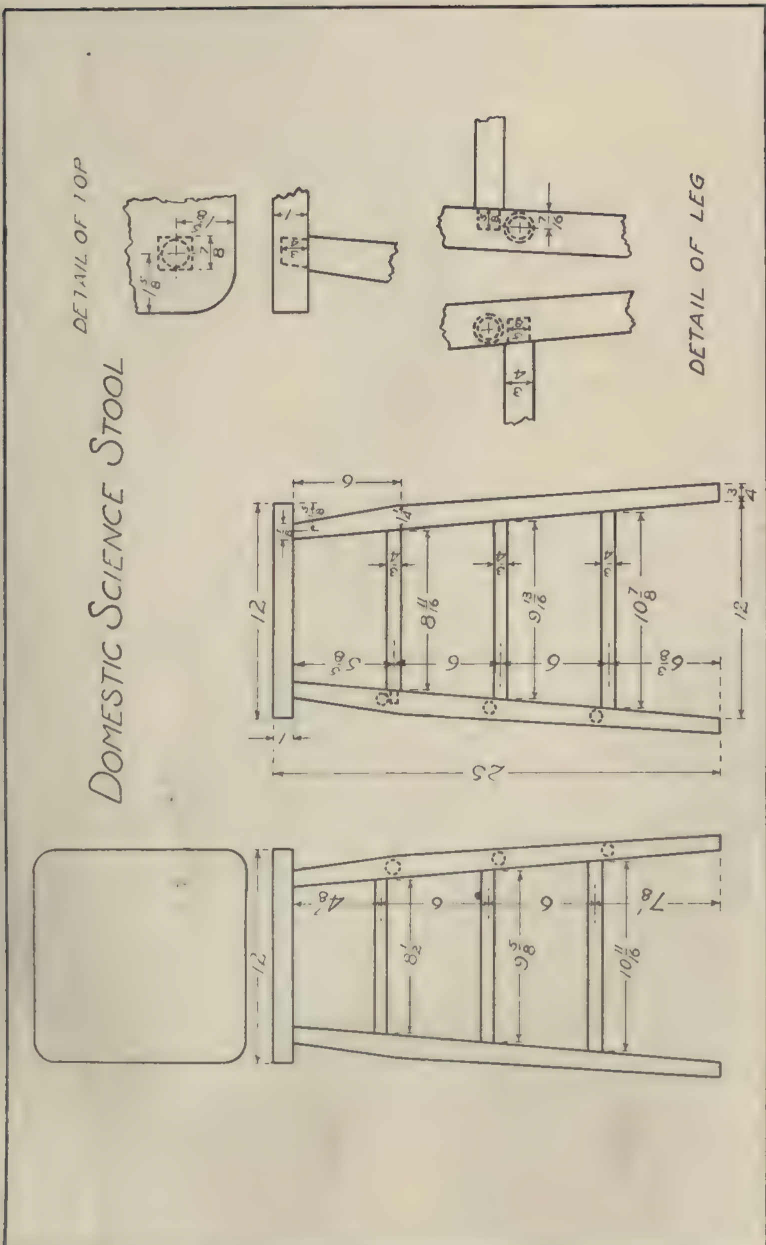
A large majority of the furniture problems of the manual training shop have their origin in the needs of the living room of the house so the light serving table shown for use in the dining room will be of especial interest. The design for this easily constructed and satisfactory piece of furniture was sent by R. E. Poplett, of Mattoon, Illinois, under whose supervision the project has been undertaken.

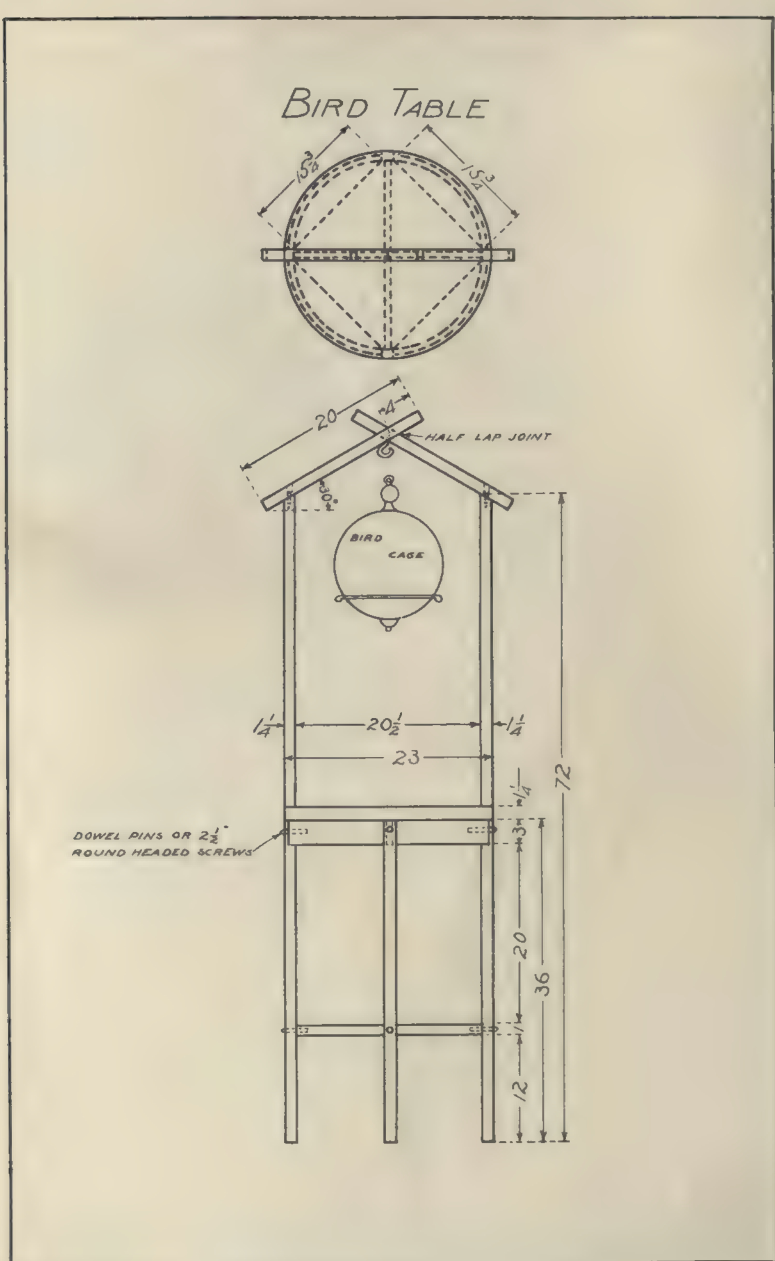
BIRD TABLE.

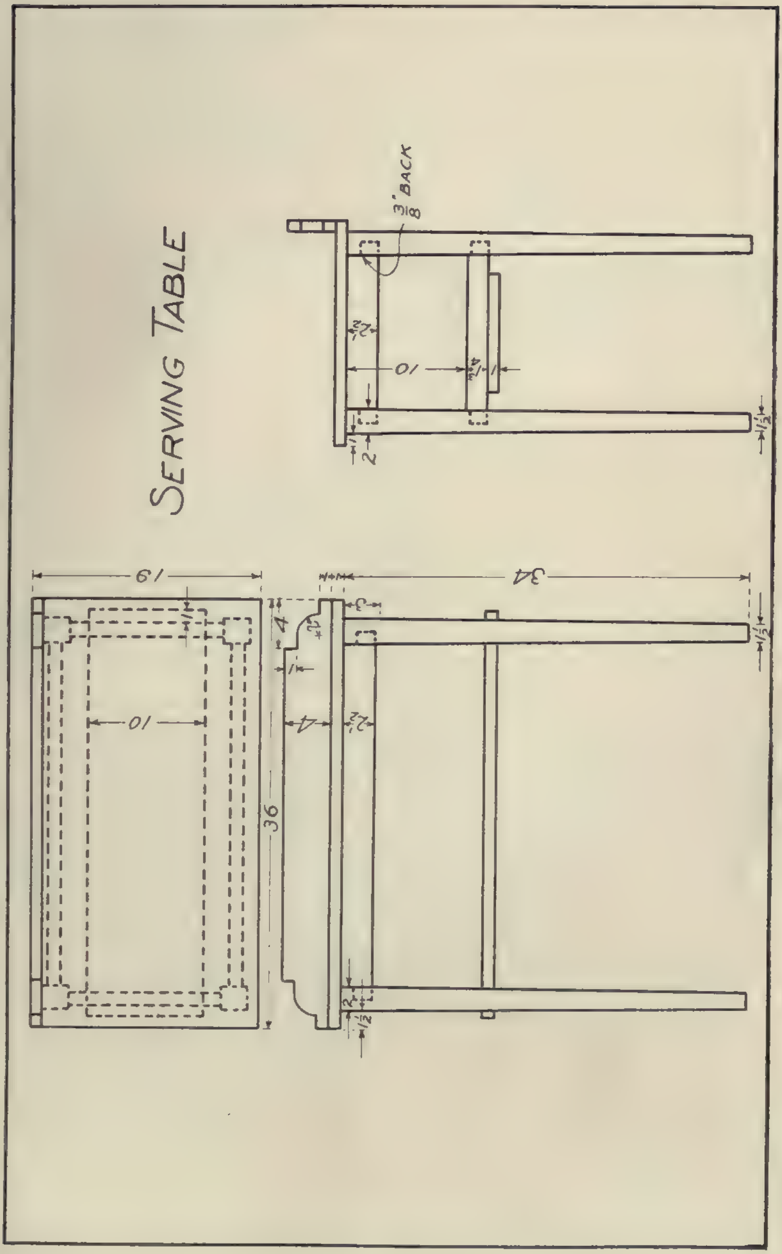
For those who have a bird in their home the drawing contributed by E. F. Kranquist of the Northeastern State Normal School, Talequah, Oklahoma, may be very suggestive. A small round top table is made and two of its legs are allowed to extend above the top where they are joined together by a gabled cross arm which provides a support for the bird cage.

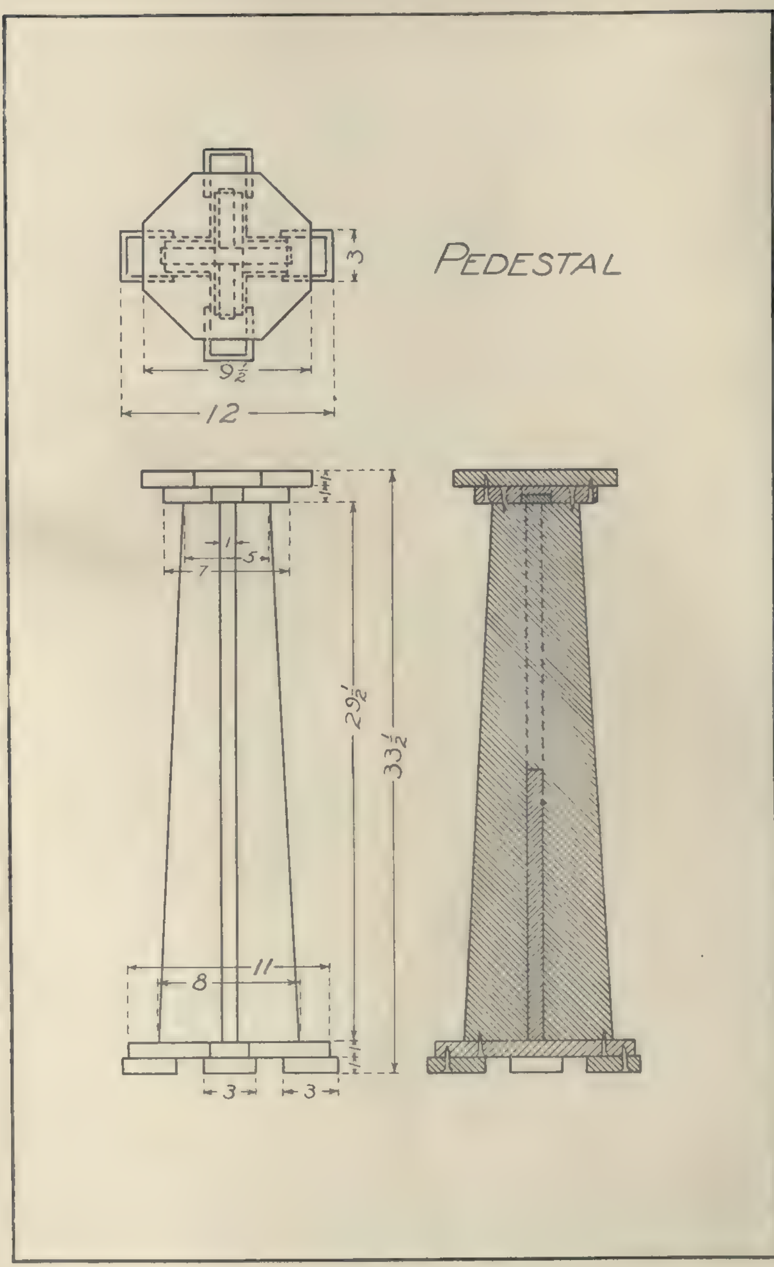
SQUARE-LEGGED STOOL.

Any who are interested in making stools for either the drawing or domestic science departments, will find the working drawings of the square-legged stool of value. This has been used in the Odd Fellows Orphans Home


DOMESTIC SCIENCE STOOL
DETAIL OF TOP
DETAIL OF LEG


BIRD TABLE
$15\frac{3}{4}$
$15\frac{3}{4}$
20
4
HALF LAP JOINT
30°
BIRD
CAGE
$1\frac{1}{4}$
$20\frac{1}{2}$
$1\frac{1}{4}$
23
$1\frac{1}{4}$
72
DOWEL PINS OR $2\frac{1}{2}$" ROUND HEADED SCREWS
3
20
36
1
12


SERVING TABLE
3/8" BACK
19
10
36
34
4
2


PEDESTAL
3
9½
12
1
5
7
29½
33½
8
11
3
3

at Lincoln, Illinois, by Harold C. Porter, who says concerning the stool, "The advantage of this kind of a stool is in the leg. Two true surfaces are first obtained from which it is quite easy for a boy to obtain the desired other two sides. The rails can be made from ¾-inch dowel rods. In putting them together, I made a clamp by means of which I did away with the use of two or three bar-clamps and with this arrangement was able to put a chair together with hot glue in about 25 minutes. The top is square with rounded corners."

PEDESTAL.

An article of occasional use about the home and of frequent use around the school is the pedestal. The one illustrated in the photograph is from the design of W. E. Hackett of the Boys' High School, Reading, Pennsylvania. The two uprights are joined together in a rather unusal half-lap joint.

PEDESTAL.

CURRENT ITEMS

A NEW BUILDING AT LA CROSSE, WISCONSIN.

A three-story annex to the high school has been erected in La Crosse, Wisconsin, as the result of a generous bequest from Frank P. Hixon. This annex is devoted to the uses of the manual arts department and includes, also, a gymnasium. It is connected with the high school building by two corridors.

On one floor are located the rooms for mechanical drawing, for woodworking, and two vacant rooms to allow for later expansion of the department. On the lower floor are found a lumber-storage room with outside entrance, the lathe and mill room, the machine shop, the foundry, the forge shop, and a wash and locker room. The remainder of the building is devoted to the gymnasium, with swimming tank, shower bath-room, and locker room.

The mechanical drawing room accommodates twenty drafting tables. In this room each student will spend ninety minutes a day, two days each week, thruout the four years of the high school course. The room for benchwork is equipped with twenty-four benches, a small jointer, a patternmaker's lathe, a small band saw, and a revolving oil stone. Here joinery, cabinet making, and pattern-making will be taught, the machine equipment in this room being provided for the work in pattern-making. The bench room is separated from a finishing room by a glass partition. This bench room is the best lighted room in the building.

An elevator connects the bench room with the lumber room on the floor below. Adjoining the lumber room is the mill and lathe room, equipped with ten wood-turning lathes, a planer, rip-saw, cut-off saw, jointer, tenoner, mortiser, grindstone, and band-saw. In this room the students, in milling lumber ready for the woodworking shop, will be given experience on each machine so that they will know how to operate all of these machines when they enter a commercial shop.

The machine shop is equipped with substantial benches underneath the windows and the usual complement of machines, run by electric motor, including a planer, cold-metal saw, three engine lathes, drill press, sensitive drill, speed lathe, tool and cutter grinder, emery wheel, and milling machine. The course in machine shop practice is given to seniors for ninety minutes a day, three days a week.

The foundry equipment consists of a cupola, a brass furnace, and a core oven. Stalls or brackets will be provided on the wall under the windows for snap-flask work, and the center of the room is to be used for floor-moulding. Ninety minutes, three days a week, is the time allotment for this room. The work will be taken by second and third year students in the last half of each year. They will mould the patterns made in the pattern-making course.

The forge room is equipped with twelve down-draft forges, anvils and tools, two fans, two sixteen-foot benches with blacksmith's vises, a trip hammer, emery

wheel, and power shears, the three latter being connected with a five-horse-power motor.

An interesting thing in connection with the new building is that the installation of all equipment, except the foundry equipment, was done by the students of the manual training department. Much of the furniture, also, was made by them. This work of installation was done slowly and carefully as a project, and thru the study of shafting, putting in belts, and placing the machines so that each machine would have sufficient clearance and would interfere with no other machine, the boys gained invaluable experience and an insight into many practical problems in the factory world.

The students have done considerable productive work the past year, including six teachers' desks, twenty drawing-tables, and five benches for the new annex, together with many odd jobs and repairing. Arrangements have been made for a large order of furniture for the schools to be made this year, in fact the department expects to handle all the school repairing and furnishing.

The aim of the work in this department is not the teaching of any one trade, but rather the giving of a general foundation in the basic principles applicable to all trades. However, practical methods and commercial shop record keeping are employed as much as possible to give the student familiarity with industrial life. The work of the department is intended as a means of vocational guidance, and as a means of building the kind of character that will result in vocational efficiency. Supervisor Erwin A. Peart has summed up briefly the points boys finishing the course should have gained:

1. An equivalent to two years apprentice work.
2. How to work metal and wood.
3. A general knowledge of the common lines in manufacturing and a realization of the relation of one to the other.
4. The ability to read working drawings intelligently, making the workman more independent and taking up less of the time of the foreman he may be under.
5. The ability to think for himself and to proceed with the problem in hand in a workmanlike way.

With these aims in view and with a new building, generously equipped, the La Crosse manual arts department should go far toward setting new and higher standards for western Wisconsin.

PREVOCATIONAL CLASSES IN TACOMA.

Prevocational classes were organized in two of Tacoma's school buildings at the opening of the present school year. In a circular of information sent out to patrons, Superintendent W. F. Geiger stated that these classes are intended to benefit three types of pupils; first, those who are likely to be compelled to earn their own way as soon as they become fifteen years of age; second, those who are mechanically inclined, that is, those who are planning to follow a trade; third, those whose needs seem not to have been met by the regular grade work and who desire a course of study which will give them more manual training or home economics.

The prevocational classes are open to any boy or girl who has completed successfully the work of the sixth A class, who has the recommendation of the principal from the last school attended, and whose parent or guardian makes a written request for the pupil's admission. This presents the prevocational class as a privilege, not as a last resort for backward pupils, a distinction which has much to do with the attitude of both parents and pupils.

Separate classes for boys and girls are provided, the membership in each class being limited to twenty-five. This totals fifty pupils at each of the two centers. The school day begins at nine o'clock in the morning and closes at three twenty-five in the afternoon. One half of the school day is devoted to manual training or home economics; the other half to arithmetic, language, penmanship, spelling, hygiene, history or geography.

Pupils completing the required two year's course in the prevocational classes will be admitted to high school on an equal footing with those from the regular grammar grades.

The academic work in these classes is a good example of reduction to essentials, and the following outlines show how correlation with shopwork may be accomplished and how a vocational content may be given to the old established subjects in the school curriculum:

Arithmetic:

Fundamental processes with fractions and decimals.
Mensuration.
The measures and their applications.
Areas of rectangles, triangles, and circles.
Percentage and applications.
Problems to be drawn from shopwork.
Bills.
Keeping simple accounts.

Geography:

Simple map reading.
Study of natural resources, industries, and products.
Trade routes and industrial lines.
Location of trade centers.
Visits to wharves, mills, and factories.

History:

Important facts of U. S. History, presented biographically.
Special emphasis on Civics in last half of last year.

Hygiene:

Health rules for shop and home.
Care of body.

Reading:

Reading along industrial, commercial, and historical lines.

Spoken and Written English:

Penmanship.
Dictation for punctuation, capitals, margins.

Composition.
Letter writing:
- Business.
- Applying for a position.
- Ordering goods.
- Acknowledge receipt of goods.
- Asking for a recommendation.
- Writing a telegram.
- Friendly.
- Postal information.
- Explanation of processes.

Grammar for the advanced division:
- Nouns—Kind, number, possessive case.
- Verbs—Tense, agreement.
- Pronouns—Case.
- Adjectives—Comparison.

Spelling:
- From words in other work.

CREDIT FOR HOME WORK.

The Board of Education in St. Cloud, Minnesota, recently adopted a plan for giving credit for outside work toward graduation from the high school. The purpose of the plan is to unite the home and the school; to connect the work of the school with the life going on outside, and to encourage the pupils to spend a part of their spare time at some useful occupation. It is hoped that the plan will direct their work in a measure toward everyday, practical tasks; will train them for service, not merely the acquisition of knowledge; and that they will become better fitted for the actual conditions around them, for complete living. The ideal toward which all such work tends is industrial, social, and home efficiency.

The arrangements of credits for gaining the high school diploma are as follows:

16 Units are required for graduation, at least 15 of which shall be regular school credits. One credit may be granted for systematic and definite home or continuation work as outlined below.

17 Units are required for *graduation with credit*, two of which may be for home or continuation work. Standings must average pass plus or above 80.

18 or more units are required for *graduation with honor*, three of which may be for home or continuation work. Standings must average pass double plus or above 90.

Pupils may graduate on the old plan, with 16 or more regular school units. To graduate *with credit* on this basis an average standing of pass plus must be obtained, and for graduation *with honor*, standings must average pass double plus.

OUTSIDE WORK.

The following outside work when properly certified will receive credit as indicated: Regular weekly piano, violin, cornet, pipe organ or voice lessons, under an accredited instructor, ¼ unit per year for not to exceed four years; Active membership in any high school or approved city musical organization ¼ unit per year; High school glee club or chorus work ¼ unit per year; (Credit for music work is limited to 1½ units); Literary society work, or rhetoricals, debate, public speaking or expressive reading ¼ unit per year; Granite or paving block cutting, or work in any of the local trades, shops, factories or industries ¼ unit for each summer vacation; Clerking in store, bank, bindery, publishing house or office ¼ unit for three months; Steady work on a farm, followed by a satisfactory essay on some agricultural subject, ¼ unit for three months; Horticulture, gardening, poultry raising or bee culture with essay ¼ unit for one season; Raising one-fourth of an acre of onions, tomatoes, strawberries or celery, one acre of potatoes, two acres of pop corn, five acres of corn or alfalfa, ¼ of a unit; Running a split road drag or doing other forms of road building for three months, ¼ unit; Judging, with a degree of accuracy, the different types of horses, cattle and hogs, ¼ unit; Selecting, drying and testing seed corn, ¼ unit; Faithful definite work in the home, with well written essay on suitable topic, ¼ unit for three months; China painting, oil painting, crayon, burnt wood, art needle work or other handicraft or home decoration work, with exhibit, ¼ unit; Three months' employment in a dressmaking establishment, ¼ unit; Three months' employment as nurse, ¼ unit; Three months' summer vacation travel, with written description, ¼ unit; "See Minnesota First" trip under approved instructor, with essay, ¼ unit.

HOME TASKS.

The following home tasks when well done and certified by parent or guardian will represent ⅛ of one unit or credit: 1. Shingling or painting the house or barn; 2. Making a canoe or boat; 3. Swimming 300 feet at one continuous performance; 4. Installing three or more electrical conveniences in your mother's home; 5. Taking sole care of an automobile for one season; 6. Preparing one meal alone daily for three months; 7. Baking the bread for three months; 8. Cooking meat and eggs three ways and making three kinds of cake, exhibit; 9. Making beds daily for three months; 10. Doing the laundry work weekly for three months; 11. Making a waist, dress or night-gown or other wearing apparel or articles for the home; 12. Making a hat or cap; 13. Keeping a flower garden, with ten choice varieties of flowers; 14. Recognizing and describing twenty different native birds, trees and flowers; 15. Sleeping for one year in the open air or with open window; 16. Keeping a systematic savings bank account for one year, with regular monthly deposits.

A PREVOCATIONAL SCHOOL IN LOUISVILLE, KENTUCKY.

Thru the cooperation of the Consumers' League and the Board of Education, a prevocational school has been organized in Louisville. Louis A. Bacon is in

charge of the industrial work and Miss Edith Lovell has the academic work. The industrial work at present consists of woodworking, printing, and bookbinding. The students are grouped in two divisions, each division spending half of each day in the industrial work. There are twenty boys and twelve girls enrolled. These were selected from those children who had already left school to go to work or who intended to do so as soon as they were fourteen years of age. The school hopes to hold these pupils two years. The way will be made possible for them to enter the high school when their teachers recommend them for entrance.

The work in woodworking and other industrial subjects differs from the work in manual training given to the other seventh and eighth grades in the city, in that the time element is considered and that the work is differently organized. In manual training a boy makes a table by himself, making and finishing all parts alone. In the prevocational class children work together on several tables, one group working on legs, another on the tops, another on finishing and so on. In the print-shop the pupils work under a pupil-foreman and turn out printing jobs for the schools.

The academic work is made very practical and is closely linked with the shop work. The boys and girls are doing the same work in both shop and classroom in this school.

As in prevocational schools in other cities, the work in the Lousiville school aims to hold the pupils in school longer by vitalizing all phases of school work; to give the pupils an idea of the various practical activties of life and the industries of their city, thus forming a basis for vocational choice; and to give them acquaintance with industrial standards, especially the value of time. For instance of this last point, the boy who is slow but accurate is praised for his accuracy but is urged to a quicker pace, while the boy who is quick but inaccurate receives such training as will improve his accuracy without loss of speed.

One feels, in noting points like these in the prevocational school, that this individual, corrective instruction is what every pupil in the public school needs, but, unfortunately, the deficiencies do not as frequently reveal themselves under the usual routine and the large number of pupils under one teacher in the average schoolroom forbids the analysis of personal peculiarities and the individual attention necessary to correct them.

THE NORTH DAKOTA STATE NORMAL AND INDUSTRIAL SCHOOL.

At Ellendale, in the southern part of North Dakota, is located the North Dakota State Normal and Industrial School, a school with a large field of activity and courses of study adapted to the needs of several different types of students. Willis E. Johnson, formerly vice-president of the Northern Normal and Industrial School of Aberdeen, South Dakota, became president of the Ellendale institution this year. Under his administration the school will undergo a few important changes and will continue its policy of broad service and of education for

efficiency. Two changes already made are the elimination of preparatory students and the arrangement for practice teaching in the city schools.

Three main classes of students are served by the school; eighth grade graduates who desire a high school education, or a high and normal school education; high school graduates who desire normal training; and any students, regardless of preparation, who wish to gain proficiency in some subject or line of work by means of short courses.

The work of the school is arranged in two main departments, normal and industrial, altho the work of the two departments necessarily joins in the preparation of students for teaching manual training or domestic economy. The industrial department, besides its work of teacher-training, trains young men and women for industrial life or for further technical study in higher institutions. For this purpose the department is subdivided into departments of mechanic arts, agriculture, fine arts, commercial work, stenography, and dressmaking. Students of this main industrial department have open to them also, intensive one-year vocational courses covering fifteen trades.

Of special community service is the work of the winter term of short courses. A definite effort is made to give men and women coming for this short course work just what will fit their immediate need, in work in the shops, the kitchen, or the academic classes. Seventy people availed themselves of short-course opportunities last year.

The school has a total enrolment of three hundred and thirty-nine, and has twenty-two instructors. A. E. Dunphy heads the department of mechanic arts.

CONCORD'S INDUSTRIAL CLASS.

In Concord, New Hampshire, is found an example of a vocational class which has developed from the work of the manual training department. The Morrill school, in Concord, has been used for several years as the headquarters for manual training, with A. W. French in charge. Every year there appeared in the manual training classes boys who were older than the remainder of the class. Mr. French has made a study of this type of pupil and finds that many of these older boys can continue their education but a few years and do not expect to and usually cannot attend high school. They show exceptional talent for mechanical work but if they leave school with no further preparation than that offered by the regular elementary school they become unskilled laborers. With the increased cost of living the status of the unskilled laborer becomes steadily worse, and it was with the hope of helping some of these boys to escape this condition that the industrial class was organized, in September, 1911. Ten pupils were selected for the first class. Last year the number was increased to twenty, averaging over sixteen years in age.

Mr. French tells of the work in the annual school report, in the following paragraphs:

"The boys in this department go to the Morrill School six hours a day for five days a week. One half of the time is spent on academic work and the other half on shop practice. The academic work consists of English; the writing of

compositions on things learned in the shops, on lectures and shop talks, business letters, and reports. Mathematics is taught by first reviewing arithmetic and then taking up shop problems such as figuring cost of stock for certain jobs, speeds and sizes of pulleys to run the machines in the shops. In commercial geography the industries, transportation, social and labor conditions are studied in order that the boys may gain a practical knowledge of the conditions in the world at large. In civics the city, state, and national governments are studied and once a week a class meeting is conducted by the boys at which debates and discussions are held. Current events are studied from newspapers and magazines. In all these subjects an effort is made to correlate the work very closely with the shop practice and the future life of the pupils. The academic work is all taught by the same men who teach the mechanical branches. This work could not be taught in the other schools for several reasons, the principal one being that these boys need male teachers, who are familiar with shop conditions and discipline and know just what problems the boys will meet on going to work.

In the shopwork the pupils are first placed in what is called the prevocational division and given instruction in several kinds of work in order to find out for what each is best fitted. Just as soon as a boy shows a talent for one kind of work more than another he is given as much of it as possible, not with the idea of teaching him a trade but of preparing him for it so that when he leaves school he will at once apply for an apprenticeship in the work. This differs from the work in the mechanic arts course in manual training in that it has a commercial value and has to be up to a commercial standard.

The shopwork includes mechanical drawing, wood-turning, forging, machine-shop practice, and printing. The work done is largely repair or order work for the schools, such as laying new floors, making new desks or tables, placing partitions, and printing programs, cards, tickets, report blanks, etc. Some motto cards printed at the annual exhibition are exceptionally well done.

The work of the industrial course has received public recognition and endorsement from the Board of Trade and the Central Labor Union. This endorsement together with the increase in enrolment indicates that the course is meeting a local need.

PROGRESS IN EL PASO.

The manual training work in the El Paso, Texas, schools seems to progress and widen in its scope in spite of disturbed conditions due to the city's location on the border of Mexico. Manual training, mechanical drawing, domestic science and domestic art have been taught in El Paso for five years.

There are eight shops, one mechanical drawing room, ten sewing rooms, four domestic science laboratories and one laundry in use at the present time. The work in these branches is carried on by a corps of thirteen instructors, including the supervisor.

Woodworking equipment only is at the service of the manual training classes. The work is begun in the fourth grade and is carried thru the tenth grade. It includes cardboard construction in the fourth grades; work with thin woods in the fifth; bench woodworking in the sixth and seventh; joinery and

cabinet making in the eighth; advanced cabinet making in the ninth and wood-turning and pattern-making in the tenth. A two years course in mechanical drawing is given in the high school. In sewing the work is begun in the fourth grades and is carried thru the ninth grade. The first two years are given entirely to hand work. In the sixth and seventh grades the making of simple garments is taught and machines are used. In the ninth grade cutting and fitting is taught together with fancy sewing. In cooking the work is begun in the eighth grade and carried thru the first year of high school, in the American schools; and in grades five to seven in schools made up entirely of Mexican pupils. The laundry work is given in the fourth grades in Mexican schools.

Some innovations in the department this year are: the organization of a class in dietetics and invalid cookery for the graduate nurses from the local hospitals. The demand for this class has grown out of new requirements inaugurated by the State Board of Examiners, for graduate nurses. The local hospitals have not as yet made provision for this kind of instruction, and are very appreciative of this move on the part of the domestic science department of the public schools. This class is under the direction of the high school domestic science instructor, Miss Margharetta Le Baron, and is open to any nurses in the city.

In the manual training classes an attempt is being made to give the boys in the upper grammar grades and high school some real practical work in doing odd jobs about the schools, as the painting of signs, building racks for bicycles, framing pictures, refinishing and repairing furniture and installing equipment. Plans are also under way for the construction of a portable schoolroom, of the knock-down type, to be used as an overflow room at buildings where crowded conditions exist. In the sewing classes the bean bags, for use in the physical training work throughout the schools, are being made, also towels and curtains for the domestic science rooms are to be made by the classes.

The Chamber of Commerce, of the city, has set aside a section in their building for a permanent exhibit of the work along industrial lines being carried on in the public schools. This exhibit will include this branch of instruction from the kindergarten thru the various types of work in the primary grades, and domestic art and science, manual training, mechanical drawing and art, in the grammar grades and high school. The aim is to make this exhibit thoroly representative of all that is being done in this line in the public schools so that visitors passing thru the city, who do not have time to visit the various schools, may see in a concise form what is being done along modern educational lines in the city schools. One section of this exhibit will consist of pictures and descriptive matter showing and explaining the various shops and laboratories, machinery and equipment, and individual pupils and classes at work on the construction of the various models on exhibition.

At the regular monthly teachers' meetings, the manual arts teachers have decided to take up, in addition to the regular state reading circle work, the study and discussion of the various movements, of the present day, along the lines of industrial and vocational education. The different members of the corps volunteer to write to the school officials in places where new plans are being

tried and to obtain as much data as possible concerning the plan and its success, and to report on this investigation at the monthly teachers' meeting. The aim of this plan is to encourage teachers to keep in touch with advancement in their line of work, and to bring to the El Paso schools the best ideas along lines of industrial training.

The supervisor W. A. Burk is assisted by three new instructors in the deparment this year; Mr. E. C. Beezley of Detroit, Michigan, Miss Janet Mack of the College of Industrial Arts, Denton, Texas, and Miss Blanche Bailey of the Santa Barbara Normal School of Manual Arts and Home Economics, Santa Barbara, California.

Troy, New York, has a new school building, called the Central School, which includes grammar grades, vocational classes, and a commercial high school. The building is five stories in height and cost close to a half million dollars.

Departments of manual training, household art, and household science have their headquarters in this building. In time, it is planned, the manual training department will develop into a department of vocational training, but because of the pupils' lack of experience in manual work, the instruction this year will be confined to work of a prevocational nature.

W. C. Smith is principal of the school; S. W. Rounds directs manual training; and Miss Mettie B. Hills is in charge of the special work for girls, assisted by Miss Helen Ryan and Miss Mary Quigley.

At Bellows Falls, Vermont, the manual training department includes work for grades six, seven, eight, and nine. The boys are devoting the time allotted to this department in projects connected with the school. Later in the year they will spend some time in making individual projects for their own use, such as pieces of furniture. At the suggestion of the superintendent of schools, the department has undertaken the building of a grandstand for the public playgrounds. When completed it will be 36x18½ feet and will seat two hundred people. Cement foundation blocks will be used at the base of each support. The plans have been drawn by the high school class in mechanical drawing. Each boy is required to figure the amount of lumber required, the quantity of cement to be used, and the time spent in construction.

In addition to the work being done on the grandstand the boys have refinished many desk tops for the schoolrooms, have laid about 880 square feet of wall surface with alabastine, have refinished woodwork, built saw-horses, placed blackboards, and have built a tool cabinet. The latest project is finishing three dozen chairs purchased unfinished.

Edward E. Parlin is supervising the manual training in Bellows Falls.

Departments of manual training, domestic science, and domestic art have been installed in Laramie, Wyoming, at a cost of $2,000 for equipment. The equipment for manual training consists of double benches, with ten drawers; speed lathes with a three horse-power motor; a thirty-two inch band saw;

and a tool sharpener. At present the subjects taught are joinery, cabinet-making, and wood-turning.

The domestic science department is equipped with electric hot plates, electric ovens, electric cooking vessels, magnesium-topped tables, a sixty-gallon hot water tank, an individual heater, porcelain sink with double dripping boards, and lavatories, cubboards, etc. The domestic art rooms are supplied with the necessary tables, lockers, mirrors, sewing-machines, models, and electric irons.

The Laramie schools are organized on the "six and six" plan, four years in the Senior High School and two years in the Junior High School. The work in the special subjects is optional in the Senior High School, and ninety minute periods are given to them. In the Junior High School the work is mandatory. Forty-five minute periods in woodworking alternate with periods in industrial and mechanical drawing, while cooking and sewing alternate for the girls.

Ernest Gilbert, of the Peru, Nebraska, State Normal School, is director of the manual training in Laramie.

Increased interest in art metalwork as a manual training subject is evidenced by its introduction this year into the curriculum of several schools, among them the College of Industrial Arts in Denton, Texas. Equipment has been installed for the use of twelve students at a time. The work is given to such students as have had one year of college work, following high school graduation. One and one-half hours a week for twenty-three weeks are devoted to the class.

The facilities of the manual training department of the Huntington, Indiana, high school have been increased this year by the addition of equipment for mechanical drawing and art metalwork. The wood-working shop of the department is equipped with eighteen benches, six wood-turning lathes, a band saw, a table saw, and planer. The beginning students in the high school have had three years of woodworking in the grades, so that advanced work is possible. W. A. Shock is supervisor of manual training in all the schools and teaches the mechanical drawing. F. C. Mahoney has charge of the bench and lathe work in the high school. Ninety-two boys are enrolled for the mechanical drawing and manual training.

The girls of the high school are given domestic science and domestic art. A kitchen is equipped for the use of twenty girls at a time. Miss Mary Grayston is in charge. Six sewing tables and five sewing machines furnish the sewing department, which is directed by Miss Amy Barnes.

An annex, costing about $70,000, is being added to the high school in Sacramento, California, for the use of the manual arts and vocational training departments. Rooms will be provided for forge work, mechanical and freehand drawing, sewing, cooking, and millinery work. The annex will be in use in connection with both the day and evening schools.

FOREIGN NOTES

by H. Williams Smith.

Manual training books of all kinds keep tumbling out of the British publishing houses, and are to be found in numerous shop windows, in many free libraries, on scores of second-hand bookstalls, and, sometimes, on a teacher's bookshelves. Some of these books are so bad that I do not know how it can pay a man to publish them, and some are so good that I do not know how it can pay a man to write them. Some of the books would be dear at a gift, and some of them are worth saving up to get. Some of them are as superfluous and twice as harmful as a dime novel, and some of them are equal to the best books issued on other school subjects. It is probable that a host of the smaller fry will be chased into fitting obscurity by the appearance of a very big fish indeed in the shape of "The Book of School Handwork," to be published in six large illustrated volumes by the Caxton Publishing Company, of London. The book is under the editorship of H. Holman, M. A., who is one of the makers of British manual training, and much else besides. He has enlisted a staff of contributors who are specialists in their own particular subjects. A volume will appear about every two months until the six are complete. The price is somewhere about $13.00 the set, which can be paid by instalments. The present notice of the book is not written to boom its sale in America, but as a mere item of news, which indicates how manual training is progressing in England now that it has got into its stride.

A London Correspondence College has recently instituted a course in "The Pedagogics of Educational Handwork," to meet the requirements of those desiring to qualify as teachers of Handwork. Among the subjects dealt with in the course are the following: Home industries in education; Play, its nature and educational value; The aims of Handwork; Physical and Psychological values of Handwork; Primitive and modern industries; Handwork and the defective child; Handwork and art; the history of Handwork. For the complete course, which may be commenced at any time, a fee of £1-11-6 is charged for 40 lessons.

At the British Association many are the papers read and efforts made for a none-too-appreciative British Public. P. B. Ballard, M. A., read one paper on "The Need for Experimental Evidence of the Value of Handwork;" and W. F. Fowler another on "Manual Work in Education." The London County Council's Chief Inspector, Dr. C. W. Kimmins, read an extremely interesting paper on "Educational Research." Among the topics for research suggested by him was "The Effect of Handwork on Other Branches of Instruction and on General Mental Efficiency."

Teaching is as yet by no means generally recognized as a profession in the British Isles, but it is hoped that a good step towards recognition will be made

by the recent formation of a Teachers' Registration Council. Handwork teachers are to be included and a special representative is to watch over their interests. Sanguine expectations have been raised that salary and status will be bettered accordingly.

The Daily Mail recently devoted much space to a description of the evening classes conducted by Ben Wilde at Blackley in Lancashire. In one class thirty or forty small boys look eagerly on as the teacher prepares a savory stew, and learn how to make "damper" of flour and water as they make it in the Australian bush. In another class the boys sole and heel their own boots, and repair anything from a stirrup leather to a school bag. In another class the boys build a model bridge to the pattern of which they put a real bridge over a real stream when the weather permits. Swimming and life saving, ambulance and nursing classes are in full swing. Then there is the "handyman's class," where a real live painter shows them how to paint a door and paper a room and whitewash a ceiling; where a tinker shows them how to solder, and a tailor aids them in improvising football "shorts." Is it any wonder that the Manchester City Council has decided to open up similar classes in other parts of the city? My word, it's worth while being a boy these days!

Speaking at the annual meeting of the West Riding (Yorkshire) Association for Technical Education, J. Eagles, the new president, made an attack on the teaching of handicraft in elementary schools. He said that the manual work done in schools was wasteful and expensive, and that the children would be better educated at half-time work in the factories. British technical education lives in such a glass house itself, that Mr. Eagles had better not throw any more stones. Virulent attacks on manual training have not yet ceased, but it is rare that one is made by a technical teacher. More and better manual training should make for more and better vocational training. Perhaps Mr. Eagle's head is not sticking far enough above his groove to find out such things.

A special course of handwork for teachers was arranged last summer in Prague, 119 teachers attending. The materials used for the work were paper, reeds, tin and clay. A feature of the course was toy-making, for which the fruits of plants, cones, ears of corn, poppy beads, chestnuts, acorns and gallnuts, osiers, birch twigs, hawthorn, sloe and pine tree barks, moss, and the roots of heather were used. The toys, which were made were trees, bushes, animals, tools and dolls, and they were arranged in groups illustrating fairy tales and articles in school readers.

The New South Wales Government at the beginning of the present year inaugurated special training in home management for school girls in the larger city centers, and the system is now to be extended to the country schools. The Minister of Education, Mr. Carmichael, in addressing a large audience of women, said that instead of letting the girl dabble with a few French sentences that were never to be of service, or of making her learn algebra and geometry—very

good things in their way, but not of much use when it came to nursing a baby or cooking a chop—the Government had determined that during the two most important years of her school life the girls of the State should be trained in the direction of domestic science.

The vacation school of the Passmore Edwards Settlement in Tavistock place, W. C., which Americans can locate if I state that you could throw a stone at it from the roof of the Hotel Russell, has been held every summer for twelve years. Last August it had an average attendance of nearly 1,100 a day, including hundreds of the poorest children from the crowded St. Pancras streets. The occupations have included drill, gymnastics, dancing, woodwork, cobbling, rug-making, needlework, quiet games (I hope there were noisy games, also) story-telling, painting and clay modeling, a sandpit for the tiny tots; cookery and singing games. Passmore Edwards was a journalist and newspaper proprietor, and this settlement beats every kind of statue in keeping his memory green.

A requisition was received by the London County Council from a head master for material for mending and patching garments in connection with the handwork lessons. The district inspector strongly supported the application and reported to the following effect: "This is a poor school (he meant a school attended by the poor) and during the past two years a scheme for instructing the boys in patching, mending, and sewing on of buttons has been encouraged by the head master, assisted by two women teachers. Instruction is limited to one hour a week in each of the three lower classes, and all the teachers concerned are unanimous in their testimony to the good effects of the lessons. The boys patch and mend their clothing, which is often in a deplorable state, and thus are taught to take a certain pride in their personal appearance." That inspector might have thought, too, of the added comfort where every gap stopped kept so much more wind out. After cobbling comes clothes-repairing, and the *London Teacher* plaintively asks "When are we to stop." I'll tell that paper when. When all the useless, timewasting, mediaeval survivals are pushed out of the school by subjects which meet the needs of the present day.

The London County Council cannot get enough instructresses of household management. On one occasion when 96 were wanted only 84 applied. This dearth of candidates is attributed to the following causes: (a) The development of the subject in other parts of the country; (b) the high standard adopted by the Council in reference to the qualifications; (c) the want of prospects. To these should be added, a low scale of salaries. The L. C. C. like most other education authorities wants to get things on the cheap. They want to obtain scholarly, motherly women with very high qualifications who will work for very low wages. It's a clear case of *non pos.*

A London head mistress appealed for the supply of material for paper-flower making by a class of backward and mentally-dull children, as she deemed the occupation to be of great educational value, inasmuch as it necessitates careful

measuring, drawing and cutting, and not only provides training in accuracy, but also forms an elementary art study much enjoyed by the children. She added that since it was difficult to grow plants in her hemmed-in locality, the paper flowers, when made, were used for decorative purposes, and serve to make the school brighter and more cheerful.

In London are employed 399 manual instructors, assistants and nine supplementary instructors included. There are four organizers and five tool repairers. Salaries for these amount to £53,480. Up to the last summer holidays 97 instructors and assistants were passed to the higher maximum. The amount allocated for apparatus and materials for manual training in the Council's estimates for the current year is £11,000. Sixty-seven applications were made for the 1913 awards of pupil-teacherships of manual training. Ten candidates were chosen. Some of the instructors are now leaving their centers for one or two sessions a week and conducting handwork in the ordinary class rooms, for the lower standards.

The salaries for domestic economy instructresses vary from £75 to £115 a year in Manchester, from £80 to £110 a year in Bristol, from £70 to £120 a year in Glasgow, and from £80 to £115 in Surrey and Middlesex. The increments are usually £5 per annum. Some of the extra-metropolitan authorities pay better salaries than does the London County Council.

Englishmen are supposed to be greatly averse to putting all their goods in the shop window; this in a metropolitan sense. In a literal sense, *The Schoolmaster* has objected strongly to an exhibition in a High Street shop window at Barton-on-the-Humber of an interesting collection of specimens of woodwork by scholars attending the local day schools, and concludes, "in our opinion advertisements of this kind are non-educational and unprofessional."

A housecraft school has been opened at Pentre, Wales, which is fitted up as two cottages, having a parlour, bedroom, kitchen, and larder. Between the two cottages is a central lecture hall with a full equipment for teaching cookery at one end and laundry work at the other. The course includes sick nursing, and special attention is given to the care of babies, needlework, and the making of babyclothes.

Manual occupations are carried on wherever possible by the patients in English lunatic asylums, as an aid to their cure, or an alleviation to their incurableness. Some time ago a party of London manual instructors visited a great asylum, and were surprised and delighted to see how strong manual training was in the curriculum. A patient in Barming Asylum, Kent, during the past seven years has done work valued at £1,000, including a chancel screen, a communion table, a reredos and a lectern, all of which have been placed in the church attached to the institution.

REVIEWS

Light Woodwork. A course of Handwork Correlated with Practical Arithmetic, Drawing and Composition. By W. S. Alderton and J. T. Baily. Published by Edward Arnold, London, 1913. Price, 2s 6d net.

If "light woodwork" were receiving as much and as favorable attention in America as it is in England at the present time this book by the Headmaster of the Abbey School at St. Albans, and the former Secretary of the National Association of Manual Training Teachers, would find a warm welcome in America, as it already has in England. But whether one is teaching elementary woodwork or not if he is trying to correlate arithmetic, drawing and construction work in any material he will do well to examine the methods of this book. Fractions become friends, decimals lose their mystery, geometry is a delight and composition writing the logical expression of a happy experience. Many American teachers need the broader viewpoint of this book.

The book is conveniently arranged and well printed and bound. It contains many well-designed models which will be attractive even to teachers who do not appreciate the real educational significance of the book.—C. A. B.

Types of Schools for Young Children. Published by The Froebel Society, 4 Bloomsbury Square, London. Price, 1s. 2d by post.

In the year 1900 there was published by the University of Chicago Press a series of nine monographs entitled *The Elementary School Record,* which contained some of the most valuable material on elementary education that we have ever seen; yet, for some reason, this series of monographs has never been reprinted, though it was out of print and in demand almost immediately. It has remained for the Froebel Society of England to republish selections from the monographs in paper-cover form. The parts selected are the reports of school work done by the younger children.

We commend the action of the Froebel Society, and now we wish that some other publisher, English or American would republish the other discussions by Professor John Dewey in this Series. For example we need to have available the chapter on "Psychology of Occupations" and his "General Introduction to Groups V. and VI." in which he discusses skill and ends and motives, also "General Principles of Work, Educationally Considered." Such writings never get out of date.—C. A. B.

Hand-Forging and Wrought Iron Ornamental Work. By Thos. F. Googerty. The Popular Mechanics Co., Chicago. 5¼x8 in.; 197 pages, price, $1.00.

To Mr. Googerty belongs the credit for having produced a unique book that ought to have a marked effect upon attempts at ornamental forging. Too often such work is attempted without full technical knowledge of the subject, and therefore falls short of the goal. While no book can take the place of art training and experience as a craftsman, this book will do all that a book can do to make

up for deficiencies in the teacher, and in the hands of the craftsmen and students, it is a valuable guide to artistic work in wrought iron.—C. A. B.

School Janitors, Mothers, and Health. By Dr. Helen C. Putnam, American Academy of Medicine Press, Easton, Pa., 1913; 4⅞x7¼ ins., 201 pp. Price, $1.00, postpaid.

Quoted from page 170, this sentence is designated the "key-word" of this little book: "School is a part of life, not 'preparation' only, and to practice pupils in standardizing details affecting health means improving our vital statistics—the measure of a nation's right living." The mission of the book is "a constructive appeal to organizations of mothers, the housekeepers, to fulfill their responsibility for children's well-being outside the walls of the family residence as well as inside." "*Health habits educate more than health maxims.*"

The book consists of three parts, entitled: "I. Prevention of School Fatigue;" "II. Mothers' Clubs and Clean Schoolhouses;" "II. School Janitors and Health;" and two added chapters on "Practice Aspects of Biologic Science in School Administration: The Problem of Janitor Service," and "The Training of Janitors in Sanitary Care of School Premises."

This is not a theoretical treatise on sanitation, but a collection of practical and workable suggestions to parents who are sufficiently interested in their children to wish to know how to surround them with the proper environment in school as in the home. Why should parents tolerate for their children while in school conditions as to dust, cleanliness, and exposure to disease which they would not think of permitting to exist in their own home?

The ideal of this little book is that the best possible conditions for conserving and promoting the health and morals of growing children are not too "expensive" for any community. Its use as a textbook and guide by fathers and mothers, and teachers for that matter, singly or collectively, is sure to result in good for the children. —William T. Bawden, Teachers Col.

Western Drawing and Manual Training Association; Proceedings 1913 *Meeting, Des Moines, May* 7-10. Wilson H. Henderson, Hammond, Ind., Secretary.

The twentieth annual report of this association, like previous reports, is a volume of unique and permanent value, representing, as it does, the history of the art and manual training movements in the making. In the addresses of welcome at the Des Moines meeting, and in many others on the more general topics, full account was taken of the industrial interests of the time. Lack of space forbids discussion of the addresses in detail, but mention should be made of the following as of direct interest to manual training supervisors and teachers: Art in Vocational Schools by Walter Sargent; Manual and Vocational Education by John W. Curtis; Education for Industrial Occupations by George F. Buxton; Oriental Art and Handicrafts by Josephine C. Locke; The Relation of Forestry to Manual Training; and in the department round table, Technical Carpentry as a Subject for Grammar Grade Instruction by Louis F. Olson; and The Possibilities of Technical Carpentry as a Part of Manual Training in the High School by Clinton S. Van Deusen.

Report of the Consultative Committee of the English National Board of Education on Practical Work in Secondary Schools; T. Fisher Unwin, London, W. C.; 411 pages; price 1s 9d.

This is an invaluable addition to the literature of manual training including, as it does, discussions on handwork as a necessary part of a secondary education, the teaching of the various forms of handwork and the correlation of these with other branches of school work, the rural secondary school, special questions relating to the teaching of domestic subjects, handwork subjects and examinations, and lastly, the training of intending teachers of educational handwork. The appendix contains syllabuses of various handwork subjects and an historical sketch of the development of constructional handwork as an educational subject.

—V. E. W.

RECEIVED.

Fifteenth Annual Report of City Superintendent of Schools, New York, on Evening Schools. Discusses many evening school problems, and presents statistics.

Public Schools of Utica, New York. Includes discussion of the vocational school and bureau.

The Manual Training and Industrial School of New London, Connecticut. Consists of photographs of the school and its work.

Bulletin of Courses in the Industrial and Household Arts, Glens Falls Public Schools, New York. This pamphlet is interesting as an exposition of the work of a department which has made a special study of correlation between art, handwork, and household art.

First Annual Report of the Pittsburg Board of Education, 1912. First report under the new system of school administration and control. Many illustrations of interest to superintendents and supervisors. Includes report of Frank H. Ball, director of industrial training. The fine appearance of this report is to be commended.

Annual School Report, Concord, New Hampshire, 1911, 1912. Describes Morrill School industrial class.

Friends of Our Native Landscape. A leaflet describing the object and organization of an Illinois association of nature lovers.

The Montessori System of Education. T. Fisher Unwin, London, W. C. An account of a personal inspection by an English student of childhood.

Advance Information as to the Panama-Pacific Exposition, 1915. An illustrated pamphlet suggesting the scope and opportunities of the exposition.

Report of a Conference on the Teaching of Handicraft in London Elementary Schools; London County Council; P. S. King and Son, London, England. Of value for historical and comparative purposes to American teachers and students. Concerns the work of intermediate grades.

Francis W. Parker School Year Book; 1913. Published annually by the faculty of the Francis W. Parker School, Chicago. The 1913 volume discusses the morning exercise as a socializing influence. Price 35 cents. Illustrated.

The Elementary Industrial School of Cleveland, Ohio, by W. N. Hailmann. This is Bulletin No. 39 of the 1913 series, published by the United States Bureau of Education. Describes an interesting experiment, including opinions of pupils and parents.

Suggestions for the Teaching of Needlework. An English pamphlet published by the National Board of Education.

An Appreciation of the American Home as the Basis of Public School Art, by Ethelwyn Miller and Gertrude Davidson. This is a Miami University Bulletin, published at Oxford, Ohio. Contains an outline of subject-matter relating to the topic with valuable references to both books and magazines, on such subjects as pergolas, gates and gateways, doors, etc.

Catalog of the Cass Technical High School, of Detroit, Michigan. Describes one of the newer technical high schools, with continuation school departments.

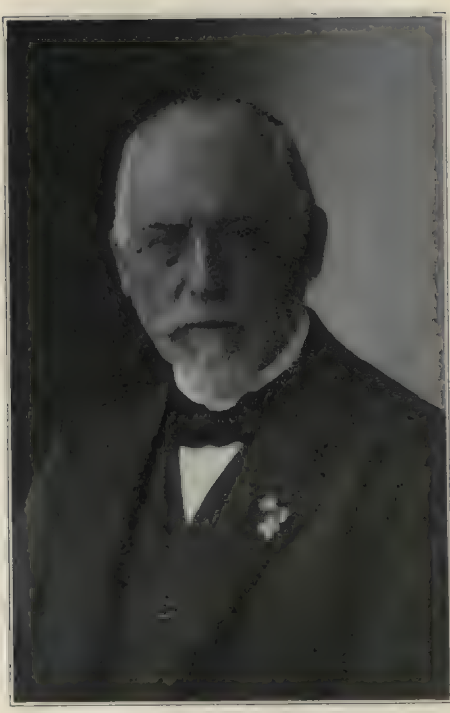
An Educational Survey of a Suburban and Rural County, by H. N. Morse, E. Fred Eastman, and A. C. Monahan. A survey of Montgomery county, Maryland, as a typical example of rural educational conditions. Bulletin No. 32, 1913. United States Bureau of Education.

The Kent State Normal School Quarterly, First Annual Catalog, 1913. A catalog of a new normal school in Northeastern Ohio.

The Child Labor Bulletin, August, 1913, *Child Labor Stories for Children*, published by National Child Labor Committee, 105 East 22nd Street, New York City. Intended to interest children in the work of the committee.

Fifteenth Annual Report of City Superintendent of Schools of New York Concerning Art in High Schools, Drawing in Elementary Schools and Shopwork in Elementary Schools. Interesting illustrations of drawing work, and statistics regarding some new phases of shopwork.

The Newton Public Schools: *Annual Report* of School Committee, Newton, Mass. The material of this report is presented in a new and unique way as answers to pertinent questions.



Dr. Alwin Pabst.

(See Editorial.)

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VOLUME XV NUMBER 3

MANUAL TRAINING MAGAZINE

FEBRUARY, 1914

VITALIZING THE COURSES IN MANUAL TRAINING.

E. H. Harlacher.

ONE of the principal causes back of the present widespread interest in manual training in the public schools is the rapidly growing demand on the part of society for "education for service", for education that fits a man for his job. Each of us leads a more or less job-centered life, and to the great majority of us the job decides our worldly weal or woe. So important is this felt to be that some of our labor unions would add it to our inalienable rights—life, liberty, happiness, and a job. If the state is to be held responsible for the employment of its citizens it must furnish them an opportunity to prepare for this employment.

For a long time it was held by both employer and employed that school preparation for manual vocations is impossible. They held to this position, even while admitting the possibility of professional training and even of commercial training, until the three-fold wedge of correspondence schools, agricultural schools, and shop schools was driven home and toppled over their wall of prejudice. The idea of a pre-trade preparation in our public schools came with a rush. It is upon us at this moment. Once manual instruction for purely educational or cultural purposes was very progressive thought; at present it is admitted without question, and we have passed on to a consideration of its value as prevocational training.

It is interesting to note that the superintendents scattered over the country were the first to appreciate that a new demand is being made on our manual training departments. The explanation is not difficult to find, for it is the superintendent who is in closest touch with the people. He stands between the school and the world. In this case he lacked

definite courses of study, suitable textbooks, trained instructors, and in many instances adequate funds; but he is making good.

It has often seemed to me, however, a strange paradox that the superintendent many times discredits his own work. After months or years of campaigning, planning, and sacrificing, he locates the manual training center in some out-of-the-way place distant from the academic centers of the public schools. The attic or the basement, unfortunately, often must receive this last addition to the family. Rarely does the superintendent visit an entire recitation, tho manual training recitations frequently violate good pedagogy. The quarters for this department are often dingy, poorly lighted and ventilated, even when compared with the poorest schoolroom in the system. The manual training periods are slipped in any way to suit the regular program. Boys instinctively feel that somewhere there is a low valuation placed on this line of work.

Some of us are properly housing our departments this year for the first time. I predict a radical change in these schools and in these communities. Much of this discrediting is done unconsciously, and none of it intentionally, and it is, therefore, with confidence that I call attention to this method of vitalizing the courses in manual training.

ADAPTATION OF WORK TO CHANGING AIMS.

Manual training courses of study may be divided conveniently into four parts: (1) The elementary construction period, following the busy work of the kindergarten and ending with the fourth grade; (2) The advanced construction period ending with the sixth grade; (3) The formal manual training period ending with the eighth grade; and (4) The vocational manual training period ending with the last year in the high school. Recognizing that there are periods having different requirements as to aim, content, methods of presentation, projects, and materials upon which to work, superintendents are in a position to vitalize the work by formulating it and distributing the responsibility.

One trouble with some of the work in manual training now going on is that it is being attempted at the wrong time or in the wrong place. A progressive community pushing an ambitious instructor is often to blame for this. For example, not long ago I saw some fifth grade boys making wooden picture-frames joined at the corners by half-lap or middle-lap joints. The teacher seemed blissfully ignorant of the fact that the children were being given something that was more appropriate

for the ninth grade. The "beavered" joints were anything but satisfactory. Not only this, but the novelty which these boys should enjoy when they are ready for this model has been destroyed. Working on this theory, I think it would be well if all work in wood could be kept out of the fifth and sixth grades.

There is another form of misplacing almost as unfortunate, and that is an unwise extension of the formal period into the vocational period. Instructors with a formal training only, lacking shop experience or the ambition to get such experience, often mark time in the ninth grade.

There is one method of attempt at vitalizing the work that sometimes defeats its very object. The superintendent wishes to show how practical his course is. A suite of furniture is needed in the office. Can the boys in the manual training department make it? Certainly. And the ship is off on a troubled voyage. The supervisor knows that with the boys, machinery, and time at his disposal it will take about three years to fill the contract. This will never do, and so he drafts all the boys in both the formal and vocational periods; no time is spent in recitation; the work in drawing is discontinued; and manual training becomes manual labor. A year of toil like this and the office is furnished! As compared with other misplaced projects there is more to commend in this sort of thing, but it would be well for the superintendent to spend some time considering the sacrifice before he agrees to a proposition of this kind.

TESTS OF EFFICIENCY OF THE INSTRUCTION.

There are two very important personages about a modern sawmill. The one scales the logs as they are drawn up into the mill, the other measures the lumber as it is being sorted at the other end of the mill. The manager has merely to compare the estimate of the lumber in the log with the actual lumber produced to judge of the efficiency of his crew. It would vitalize the manual training work if some method could be devised by which the efficiency could be tested. In academic subjects we have written and oral tests, besides constant cross reference between teachers of different branches which would detect superficial teaching almost immediately. There should be some similar check on the work of the manual training supervisor and instructor. Sets of questions made out by the superintendent to be given to the classes, reports of vocational guidance work, reports of shop visits or other work connected

with the local industries, may be suggestive along this line. It is imperative that the manual training work be tested in some way during the year, and in fairness to the supervisor there should be a carefully prepared course of study which outlines the work that it is expected will be accomplished.

This suggests the most important vitalizing element that is within the power of the superintendent—a carefully written course of study. As to content, it is to be noted that a list of models is no more a manual training course than a list of flowers is a course in botany. The statement of the course should include the aims, processes, materials, etc., as well as the projects, and a course should be outlined for the entire school period regardless of what portion is being taught.

The portion proposed will make possible an intelligent extension when the proper time comes, and will show the community the completeness or incompleteness of the present plan.

Within each period great care should be exercised to secure the best possible sequence of processes and tool operations, with some estimate as to the time to be spent on each. This will help to guide the teacher to strike the approximate speed that will be required to finish the course on time. Reviews with sets of examination questions will help the teacher to test his own work and decide as to the thoroness with which he is supposed to present each topic. There should be suggested correlations with the English, the arithmetic, algebra, and geometry of the academic courses; suggested studies of industrial materials and processes; suggested investigations that will contribute to intelligent vocational guidance; and supplementary courses for above average and below average pupils. Each project for the course should be worked out in blueprint or wall chart form ready for presentation. These should belong to the school, and should form a regular part of the equipment. No course is ready to present until these drawings are complete and stock is on hand for the entire year.

One of the weeds that has grown up in this newly planted vocational hotbed is the fallacy that all courses should be alike. Certain educational institutions have given their graduates most elaborate courses which when transplanted have sometimes withered and died, to the surprise of the new teachers and the mortification of the alma maters. The plans were no doubt good, but they could not be adapted to all the particular local soils in which they might be placed.

COOPERATION BETWEEN SCHOOL AND INDUSTRY.

Someone has characterized the present movement to vitalize manual training as an attempt to push the school and the shop together. When we contemplate the close relation that exists between learning and earning it seems as if this push should be made still more vigorous. Another has put it in this way: "Industry and the schools have been strangers, and now they would be introduced!" School life and industrial life must be cemented together so closely that when the boy leaves school to enter the shop he will not be embarrassed by the change. As Thomas Nixon Carver says: "The first duty of the school is to fit its students for industrial success in some line of production."

WORK OF FOURTH YEAR HIGH SCHOOL IN FURNITURE CONSTRUCTION, NEWMAN MANUAL TRAINING SCHOOL, NEW ORLEANS, LOUISIANA.

FIG. 1. LIBERTY SCHOOL OF MANUAL ARTS, PITTSBURGH.

NEW FEATURES IN A MANUAL ARTS SCHOOL.

W. R. HULL.

TEACHERS and supervisors in search of new, practical, and unique ideas in the manual arts, would be interested in a visit to the Liberty Manual Arts School for grade pupils recently constructed in Pittsburgh. For those not fortunate enough to visit the school, the following description of the features which seem most satisfactory and practical has been prepared.

The building, Fig. 1, which is a plain, substantial structure with a frontage of 152 feet and a depth of 73 feet, is of tapestry brick with stone trimmings, and has a cement roof and floors of maple laid on concrete. It was constructed with special attention to light and with the idea that the woodworking room in a manual training school should be a real shop, while nothing for the accomplishment of good work has been overlooked.

On the first floor, Fig. 2, is a center hall with rooms on each side and a long, narrow shop at each end. There are two work shops, two

drawing rooms, a lathe room, a heavy machinery room, lumber room, and several storerooms and closets.

The second floor, Fig. 3, is devoted to domestic science and art. The kitchen, with its working tables, six in number, each accommodating four pupils, its numerous cupboards and tile finish, is lighted by a skylight in addition to the windows. It is entered from the main hall at the head of the stairs.

At the left of the kitchen is a simple but convenient laundry, and to the right is a most spacious butler's pantry and scullery, which in turn opens into a dining-room, 21′x24′. The finish thruout the entire building is of oak. There are two large built-in china closets between which is a series of windows. The furnishing is in old English, and draperies and carpets are in keeping. The room can also be entered from the end of the hall. The front of the building opposite the kitchen is made up of two sewing rooms and store rooms. The sewing rooms can accommodate as many as thirty pupils each.

Altho the building is called a manual arts school, there is also provision made in the basement for physical training, Fig. 4. There are two large gymnasiums completely equipped, with shower and locker rooms in connection.

Referring again to the arrangement of the first floor: Some shops have been square or nearly so, with benches so arranged that the pupil did not generally have space enough to complete all of his work at his own bench. Here we have a shop 70 feet by 16 feet, with work benches attached to the walls by means of iron brackets placed in the brick walls, when the building was constructed. This leaves the center of the room entirely free and gives each pupil plenty of working space.

Above each bench, on the wall, is a tool-rack so arranged as to take care of the correct number of tools. The saws hang below the benches and every tool is in plain sight. The bottoms of the windows are just six feet from the floor, so there is ample space for benches and tool-racks below them.

For the lighting of these shops about one-half of the roof consists of skylights, and these in connection with the windows disperse the light equally. Each bench has also an electric drop light over it.

At the end of each shop is an offset in which there is an elevated platform for demonstration purposes. This platform has a seating capacity for thirty pupils. Facing it is a well equipped work bench used for demonstration.

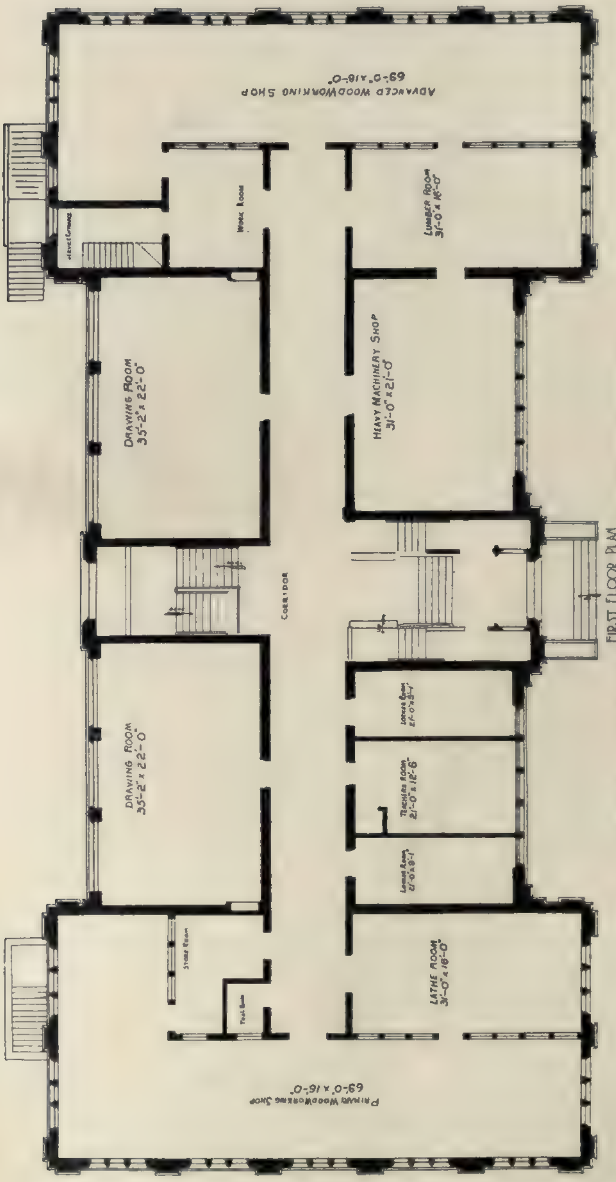


FIG. 2. PLAN OF FIRST FLOOR—BOYS' DEPARTMENT.

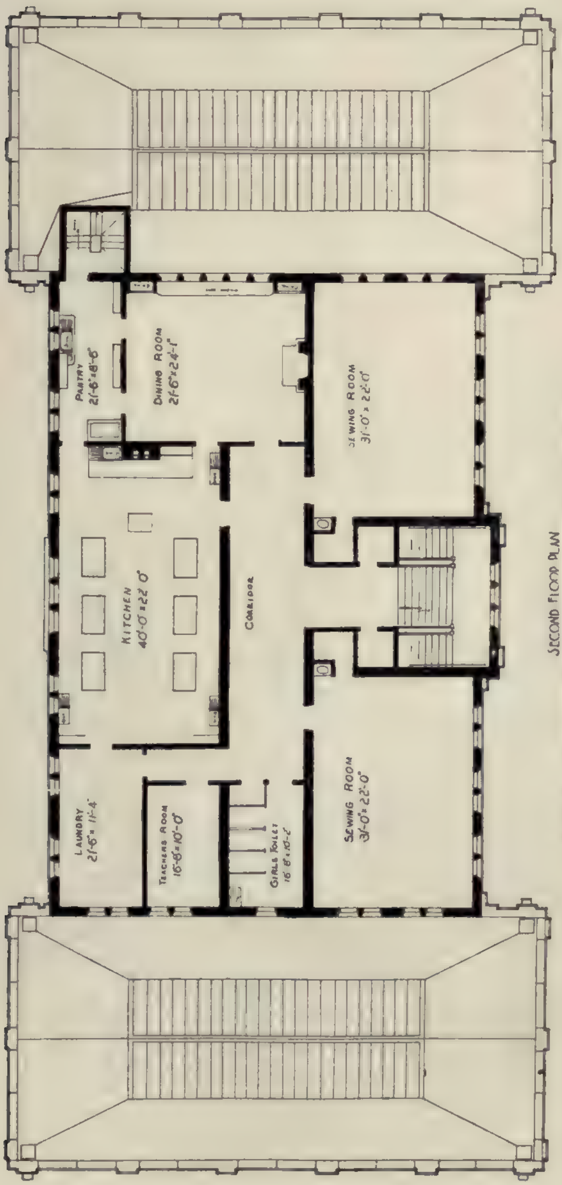


FIG. 3. SECOND FLOOR PLAN—GIRLS' DEPARTMENT.

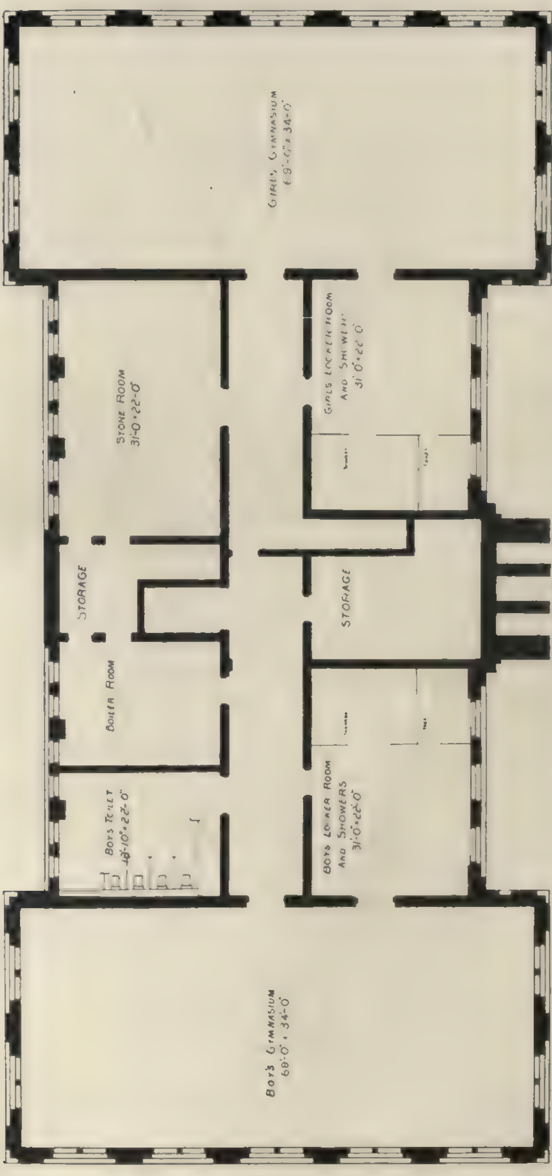


FIG. 4. PLAN OF BASEMENT—PHYSICAL TRAINING DEPARTMENT.

In the lathe room may be found both D. C. individual motor lathes and the old type driven from a main shaft under the lathes. This room is also lighted by skylights.

The lighting in the drawing rooms is somewhat unique, the entire outside wall being of glass, thus distributing all the light from one direction.

The approximate cost of this school and equipment is $90,000. Two thousand pupils can be accommodated weekly and as far as can be seen at present, the new departures here are proving themselves to be all that can be wished for.

PEDESTAL PULPIT, MADE BY NINETEEN YEAR OLD BOY AT PONTIAC, ILLINOIS, REFORMATORY, TO BE USED IN THE REFORMATORY CHAPEL. J. E. BENSON, INSTRUCTOR.

DISCIPLINE IN THE SHOP.

James McKinney.

THIS problem resolves itself into one of methods of teaching, and among the many tasks which we as teachers have to face in our daily round of duties, the problem of methods—the ways and means of accomplishing our aims, of bringing our projects to a successful finish—is perhaps one of the hardest tasks we have to face. How often do we find ourselves facing a failure, whether it be a single class recitation, or a model which the boys have made with little spirit or interest, or an industrial study which is not going smoothly. How often we are conscious of having wasted time, wasted material, lost the good will of our class, and perhaps lost faith in ourselves.

In facing these situations I am afraid we are prone to blame our boys, blame their nationality, their heritage, their city environment—blame every blamable thing, except ourselves and our bad methods of teaching.

One explanation for this state of things is perhaps our faith in the efficacy of one method for all occasions and work. As pedagogs we are apt to be easily satisfied with some textbook plan which looks "good" and easy, or we are willing to follow in the footsteps of our brothers in the craft, imitating the machine methods of mass instruction, with its active teacher and its passive class—a "bluff" at questioning and a puppet-like discipline—without much thought as to other possibilities and opportunities.

Twenty years ago it would have been thought an educational heresy to suggest that the school could get any help in developing its young citizens from the noise and clamor of a workshop, and yet today we see that the industrial world is having a large share in shaping our new educational ideals.

One of the main points which the writer wishes to make clear is that there is no one method, no "Morrison pill" for all our shortcomings. In presenting some ideas and methods which have been worked out in practice, it is with the perfect understanding that the plan suggested might require some modifications to meet local needs. The subject under discussion brings to mind various methods which are used in class instruction:

(1) The autocratic method, in which the teacher has every detail

under his own thumb, allowing the class no part in the organization of the project; (2) the participatory method, in which the class shares with the teacher the burden of the organization of the work, as help in care of equipment and supplies; (3) the industrial method, in which the teacher has forgotten much of his book pedagogy, where his mighty arm of all right is no longer wielded because he has brought himself on a plane with the worker and become a part of the group, team, or gang.

The first method has little or no place in our age, or the spirit of modern times, and the only reason one can see for its having any adherents, is that in some way they must be connected with the "tribe and lineage" of "Squeers".

The second or participatory method has many good qualities but it does not go far enough. The boys' help is fine and engenders a personal interest in the shop, but is apt to produce "favorites" and all their attending evils.

FOREMEN CHOSEN BY THE CLASS.

In the third, the industrial method, the organization of the group is a very important part of the scheme. As the boys are working in a real workshop and for the time are workmen in the embryo, it seems natural to select or copy the methods of the outside workshop for the plan of organization. This plan may be discussed in the first lesson, bringing out the necessity for leaders or foremen, also the qualities that fit the foreman for his various duties of responsibility for work and discipline. All this discussion will help a class to get into the right attitude which is necessary for successful working of the plan.

In the selection of the foremen it is best to rely on the ballot of the class, as experience has shown that the teacher can be "fooled" as often as the class in this selection. The number of foremen required may vary with the nature of the work, but in a course of study involving group work or large projects, as industrial studies of home building, bridge building, foundry, etc., three "men" are sufficient. These are a master foreman to pass upon the technique of the work, a foreman who takes up with the class any discipline problems that may arise, and a foreman who is responsible for the equipment. In this scheme of organization one may ask, "Where does the teacher come in?" His task is that of the supervisor, demonstrating how things are done, spotting the weak links in the chain, keeping the "machinery" well lubricated with the oil of joy, helping the "lame dogs", working out new plans with

the foreman, and talking "about work-a-day problems with the men."

The plan of organization is educative and economic because, (1) it brings in the spirit of cooperation, and puts the gang spirit on a real educative basis; (2) it explains the subdivision of labor and economy of time and effort as practiced in the outside world; (3) it makes a place for the poor worker; there is always a job he can do well. It also makes a place for your best and fastest worker, and an idle clever boy is no small problem; (4) it will keep the brains of the "gang" leader busy in a real educative way. The leaders will always assert themselves, and often in a manner which is not conductive to efficiency. Group work is one successful method of directing and developing your leader's energy.

By so looking after in an efficient way the varying capacities of a class, we are solving an economic problem in class instruction and developing a democratic idea of work which may mean much in the training for citizenship. The system of foremen can be applied with as much success in a large class which is working on the regular shop "model". A bright "foreman" and an assistant can do much to help the slow and poor workers, as much of their inefficiency often comes from lack of clearness of the instruction which the teacher has given the class. When a case of "deportment" has to be taken up, the individual or the class are likely to swallow the "medicine" meeted out with more grace and better effect, if the case has been publicly reported by one of their number, and not by the secret note of the shop teacher.

In closing, this word of warning is given in the same candid spirit which has criticised much of our present day methods. If you would have this method, any method, succeed,—play fair, and don't bluff, for the boys will surely find you out. If your training or nature is not elastic enough to allow your boys to help in a real way, you had better go back to the old "recipe" in your textbook, and by adding as much of the spice of your boyhood as you can recall, so sweeten and make palatable your rather dry job. If we end the day's task with a weary and heavy laden spirit, thankful that the day is done, and dreading the coming of the morning and a VII A gang, something is wrong, and it is a matter of much importance in the economical handling of a class whether we stand the day with a "grouch" or a smile. The great problem in this economic handling of a class is just whether we know where the burden of the day's work ought to fall, whether we shall bear it all alone, or let a group of willing and eager boys help.

POSSIBILITIES OF THE PRINTING DEPARTMENT IN THE SCHOOL.

R. A. Loomis.

PRINTING in itself and in what it opens up to the student should be the most important course in the manual arts department of the public school, or of any educational institution that prepares the boy for a vocation or trade. The printed page is the most widely known of all common products, yet the least is known about its production. How few there are who know how many trades there are exercised in producing a common magazine. The printing course of the school, properly taught, throws light on all the technical processes brought into use in the production of this article.

Beginning with the designing of the book—the cover, the pages, and layout for them all, the headings, foot endings, advertisements, and all the different illustrations and drawings of the book, must be planned and made by experts and artists. This conveys to the mind of the printing course student the possibilities of a life work of importance and good pay as a designer, editor, layout man or advertisement writer.

The mechanical part of the production of a magazine brings in so many industries and businesses of skill and importance of high order that the printing student is lead into the presence of many highly paid technical pursuits, and to choose and become a master of any one of them would mean a successful life.

To enumerate and explain what is meant by the above, let us take, first, the composition of the text of the book. It may be either machine or hand work. The machine composition may be either linotype or monotype work. Here at once are two highly paid trades. To go further back than the operation of the machine, we have the manufacture of the machine which represents an investment of millions of dollars in factories, and the many modern variations of line-casting and type-casting machines open up a field of work of vast proportions. The hand set type represents a great industry, whose possibilities are limited only by the skill of the man. Let the student learn of these industries, and enter and become proficient in any one of them, and his life will not have been a failure.

The numerous engravings in the magazine, both photoengravings and

line-etchings, represent professions of large proportions. Every day some expert adds a new phase to this work. A study of the above processes, including photography, lithography, off-set printing, art photogravure, cloth printing, wall paper printing, and color printing, is so fascinating and so extensive in its reach, that the ordinary man can lose himself. Any one of these branches represents years of toil by men who have given to the world the most important work of the present day. Lead the printing student into the presence of any one of these processes and let him take one for a life work and he will have something for which there is a great demand at a salary regulated only by his efforts and ability.

Along with these processes must be mentioned the industries of electrotyping, cerotyping, nickelotyping, and stereotyping. Work produced from forms made by these processes are seen on every side but how many know them by sight. Every one is highly paid and these trades need good men.

DISPLAY COMPOSITION.

The display composition of the magazine, such as advertisements and headings, represents study and skill, and the perfection of the modern examples of this art is gained only thru practice by competent men. The complexity of this work is only realized when the new man attempts it.

It would be impossible to go into the study of paper and ink to any great extent. The modern constituents of paper, as well as the processes of manufacture, are unknown to the layman. Of course, we know that paper is made from wood or rags, but how, and how much money is there in it. We know there are wealthy paper manufacturers and high salaried chemists and experts who make it. Let the printing course open up to the student the possibilities of this great work and he will know that there must be a chance to go to work at good pay.

In ink there is no end of interesting, profitable work. The right kind of ink, color, consistency, and weight for a certain job to be run on a certain stock or by a certain process represents a big problem about which only those in it know.

The making and operation of the great presses of modern newspaper and job printing plants represent great money and brain investment. Just look at the daily newspaper press in your city. The numerous

smaller presses, cylinders, rotaries, and jobbers; how much is paid for them and their operation, and how much profit is made on their production? Think of the government printing department where currency and stamps and government printing are done and all open to any one who will qualify. Visit the big job printing houses of the cities, the engraving plants and notice that these great technical trades are occupied principally by foreign born skilled workmen.

Aside from the purely mechanical processes connected with printing we have the educational and historical sides. In printing are exemplified all the grammatical constructions known. The student has a chance to put in practice the rules his teachers have taught him. He learns to punctuate, syllabicate, and capitalize, and as it is to be read by those who know, his work must be correct. The historical aspect is very important. He should learn all about the advance of the world in literature and art thru the study of printing, past and present. The first printers were perhaps the most important men of their times and as widely known and influential as many kings. The printer is the recorder of history. Men were and are promoted and demoted by the printer. Let the printing course of the school show all of these things and the department will be of more importance.

MADE AT NEWCOMB COLLEGE, NEW ORLEANS.

HOW CAN WE INFLUENCE AND DEVELOP THE CREATIVE ABILITY OF PUPILS?[1]

F. P. Hildebrand, Dresden.
Translated from the German by William T. Bawden.

THERE can scarcely be any doubt that in the school workshop the customary slavish following merely of a so-called normal course of study can not be a goal worthy of great endeavor. Such a method of procedure will satisfy only the teacher who regards as his highest task the bringing of his pupils to a certain technical manual facility. But by such a course can scarcely be realized the fundamental condition of modern education—the placing of the *child,* not the *thing,* at the center.

It is well also for the reason that the teaching body in general is, as is to be desired, coldly opposed to mere instruction in manual dexterity (let us be calm at the mention of the term!).

The task in the school workshop is often a purely mechanical one; the child with all his activity has too little to say about it, for he only copies, imitates.

Since from the pedagogical point of view it is not possible to instruct children in the same manner as grown persons, much less ought we to attempt to apply to young people of ten to fourteen years of age a course of study which is intended for prospective teachers.

We may indeed permit our boys to make the same things that the adult students make, but the projects must have—not merely technically—a suitability to child nature.

It will be objected that a child has not the capacity to make any useful object—since it is a question of useful objects chiefly. But this opinion can be maintained seriously only by him who occupies the point of view that was held generally, for example, in the teaching of drawing twenty years ago. For who approves of thoughtless copying in this subject? It is precisely so in handwork. Away with the fixed course of study! Let us have more freedom! Let us quietly permit the child to

[1] Hildebrand: *Wie Können wir die Gestaltungskraft der Schüler beeinflussen und fördern?*: *Die Arbeitschule,* the monthly journal of the German Handwork and Industrial Education Association. (*Verein für Knabenhandarbeit und Werkunterricht*), published by Quelle and Meyer, Leipzig, Vol. XXVI, No. 3, March, 1912, pp. 80-83.

design his own piece of work. But with a firm hand and with a sure tact the teacher holds the reins! He takes care that the rules of good taste and the laws of technic are followed. Thus can we bring the "mechanical" handwork instruction into harmony with the fundamental principles of pedagogy.

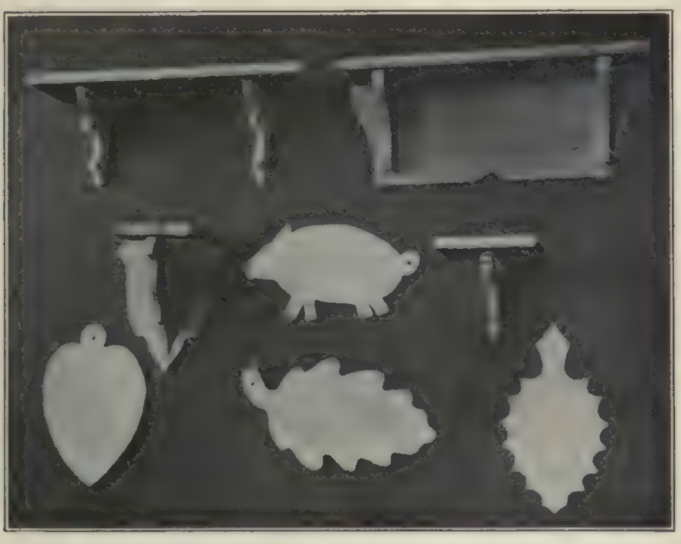


FIG. 1. EXAMPLES OF SCHOOL HANDWORK RESULTING FROM SPONTANEOUS EFFORT.

How, then, can we influence and develop the creative ability of the pupils?

In order to accomplish this it is necessary that the pupil, before the beginning of the actual work (we speak of the practical work), always form a perfectly clear picture of the object to be made. This appears best in a working drawing, to which I shall return later.

A complete conception of the creative ability of his pupils can be gained by the shopwork instructor if he will permit any object to be planned quite spontaneously, limiting his attention to the purely technical side of the work.

The finished pieces of work, in most cases, will be useless—useless in the sense that we do not wish to let them go out of the workshop. But the time thus spent is by no means wasted, for the pupil acquires some technical skill, and the teacher sees clearly and unmistakably the point of contact for his activity.

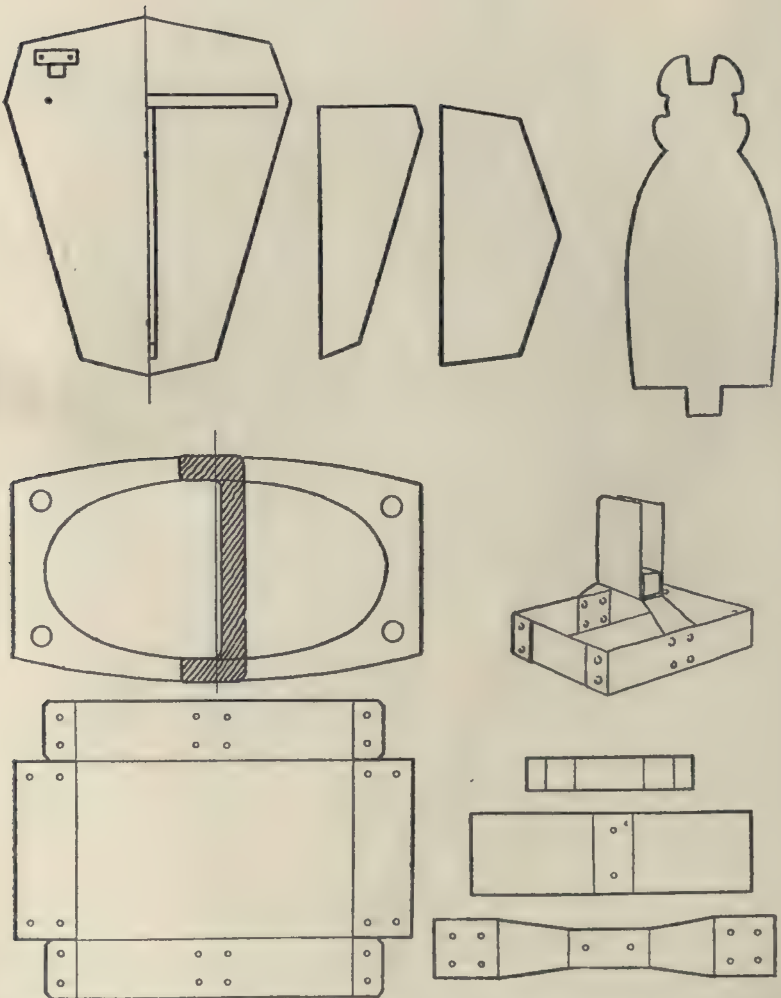


FIG. 2. WORKING DRAWINGS: BRACKET SHELF; PATTERN FOR CANDLESTICK; CLAY DISH; MATCHBOX HOLDER. IN ACTUAL USE THESE DRAWINGS ARE MADE FULL SIZE.

As a suggestion I give an example from my own experience.

I selected eight pupils ranging from ten to fourteen years of age. They all knew something about how to work with the plane and the saw, altho they had not finished these "subjects", in the meaning of the usual handwork instruction, since I had built up my course of study on different principles.[2]

I gave as a task the making of a bread cutting board, or a small

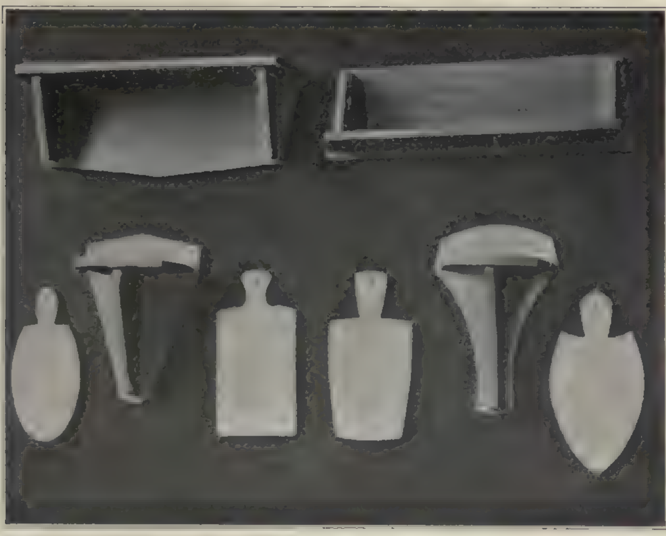


FIG. 3. EXAMPLES OF SCHOOL HANDWORK DESIGNED AFTER INSTRUCTION.

bracket shelf. After a short period of deliberation the pupils decided as to their choice of the object to be made, and busily set to work.

My assistance was limited to the necessary technical instructions; concerning the design of the models I gave out not a word, altho it made my fingers fairly itch! For the outcome of this work, as shown in Fig. 1, displays all the lack of beauty and lack of taste of a time at which unhappily our people do not even seem to be surprised. These wooden pieces are a true picture of what the child sees at home, and what, worse yet, is often shown in the store windows! In accordance

[2] See Gross-Hildebrand: Shopwork Exercises for the Development of Good Taste (*Geschmackbildende Werkstattübungen,*) Vol. 3 of "*Modern Werkunterricht;*" published by G. Stiehler, Leipzig, 1912.

with the prevailing forms of any tendency in style, which influence these small objects in much the same way as architecture, the foolish forms resulting from the "petty home craft" all show that our youth can indeed produce good work. We must only influence them in the right way, and not seek our goal in mere technical instruction.

I had naturally expected no better result, and had given the pupils only pieces of inferior spruce wood. We placed the pieces together and compared them. And the discussion, short as it was (I do not like learned explanations in the workshop), brought out a number of good points: that the *purpose* for which an object is to be used is the chief thing, and that to this its *form* must be subordinate; and that form again must be determined in part at least by *material*. One word also concerning the decoration! The sixth-form boy who "perpetrated" the little pig was very anxious to have the use of a pyrography outfit, which "unfortunately" was not available.

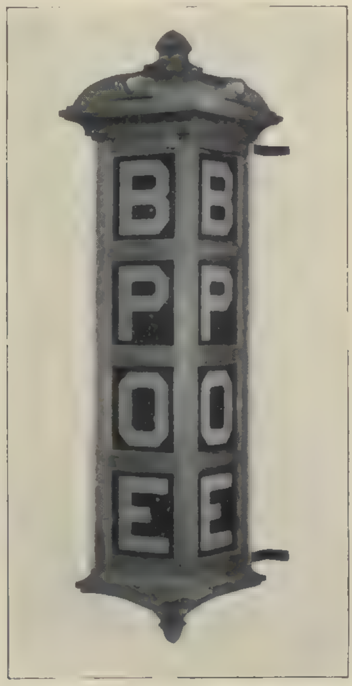
A SECOND TRIAL.

And now for the making of the "second edition!" Every pupil was required to sketch his piece on paper before he could begin the construction. This working drawing I regard as one of the most important parts of the whole work. Its careful execution saves an extraordinary amount of time and material. By this is not meant a fine execution in the sense of geometric drawing. By no means inked lines! Small objects, like the ones shown here, are drawn full size with broad soft pencil or charcoal on rough brown paper, and the final form is cut out for use as a "pattern". Often, however, the simple projection drawing must yield to the perspective sketch as, for example, in clay modeling and metalwork. But the drawing must always find practical realization, for it is here a question not of making "pictures", but of representing ideas clearly. Note the examples in Fig. 2.

To return to the woodwork! As soon as the boys had finished their drawings they were permitted to select their pieces of wood—and again the planing and sawing began. At this stage technical "accuracy" was observed, in order that, for example, the cutting board should not be 15 mm. short, or the bracket for the shelf thinner than the other pieces. The opportunity to select the wood induced one boy to choose, with a certain refinement, a beautiful piece of pine for his bracket.

In order to afford a better comparison, the results of the second effort are shown, in the "rough" state, in Fig. 3.

The artist will find fault with these things in a number of respects, for he will be thinking of sketches which have been made by artists. But I set great value upon these objects. They show what pupils can do by themselves, thru their own initiative.



ILLUMINATED WALL SIGN, HEIGHT SEVEN FEET, DESIGNED AND MADE FROM SHEET COPPER BY BOYS IN THE SHEET METAL TRADE SCHOOL, ILLINOIS STATE REFORMATORY, UNDER THE DIRECTION OF J. D. DAUGHERTY.

THE PLACE OF THE ABSTRACT EXERCISE IN WOODWORK.

IRA S. GRIFFITH.

TEACHERS of experience in manual training woodwork have settled in their own minds and practices the place of the abstract exercise. Some of these have assumed a given attitude because of a practical experience based upon a knowledge of and a full appreciation of the various historic movements in manual training woodwork. Others, it is feared have settled the matter in their own minds and practices because that is the way they were taught and the mental effort required to make a change in attitude and practice is painful. In either case the matter is settled so far as they are concerned.

Occasionally, however, one finds a "youngster" in the profession who is not satisfied with the conventional practice and who "wants to know". Such a one but recently came to the attention of the writer. He makes this appeal: "I am making use of a few abstract exercise pieces to introduce certain cabinet projects in my high school woodwork. My superintendent takes me to task telling me that my practice is thirty or forty years behind the times. Will you kindly secure the opinion of several authorities upon the matter?"

This inquiry happened to come at a time when senior manual training students at Bradley Institute were casting about for suitable subjects for theses. Ernest Yountz, one of the class, consented to take for his topic: The Place of the Exercise in Present Day Courses for Grammar Grades and High Schools.

Without presenting here his very excellent introduction in which the exercise is defined and its relation described with reference to the Russian system, Swedish sloyd, French, German, and early American systems, we wish to present his summary of present day practice as it relates to the topic under consideration.

Among other things, a card of the accompanying form was sent to forty-five cities in twenty-one states. Thirty-one replies were received. Cities answering were as follows: Aurora, Ill.; Boston, Mass.; Buffalo, N. Y.; Butte, Mont.; Chicago, Ill.; Cincinnati, Ohio; Cleveland, Ohio; Columbus, Ind.; Columbus, Ohio; Davenport, Iowa; Denver, Colo.; Detroit, Mich.; Fort Wayne, Ind.; Grand Rapids, Mich.; Houston,

Texas; Indianapolis, Ind.; Jersey City, N. J.; Kansas City, Mo.; Minneapolis, Minn.; Montclair, N. J.; Newark, N. J.; Pierre, S. Dak.; Rochester, N. Y.; St. Louis, Mo.; San Antonio, Texas; San Francisco, Calif.; Seattle, Wash.; Springfield, Mass.; Spring Valley, Minn.; Washington, D. C.; Wilkesbarre, Pa. This is certainly a very representative lot of replies.

BENCHWORK IN WOOD

NOTE — Place numbers in columns 2 and 3, and an x in either 4, 5 or 6. If you mark in 6, please give below the approximate time given to exercises, and state at what time they are introduced into the course.

1 GRADE	2 Approx. No. of Students	3 Hours per Week	4 All Exercises	5 All Useful	6 Part of Each
6					
7					
8					
9					
10					
11					
12					

Name of Teacher or Supervisor____________________

City____________________ State____________________

A most interesting study is to be had from a perusal of the data received. It is possible, however, to consider here only the summary and general conclusions.

SUMMARY.

Grade	Approximate No. Students	Avg. time per week hrs.	min.	All exercises.	All Useful.	Part of Each
6	40,000	1	20		18	4
7	40,000	1	40		21	8
8	30,000	2			18	11
9	5,500	4			7	14
10	1,500	5			5	6
11	1,100	5			6	5
12	6,000	5			5	5

From this data it will be seen that no school reports a course composed of abstract exercises only. Again, it will be seen that in the lower grades a few schools give exercises in connection with useful models but that the emphasis of the majority is upon the useful model or project.

It is also to be observed that this emphasis upon useful models decreases as the grade number increases until the exercise receives greatest emphasis in grade nine—the first year high school. After the first year high school the course composed of exercises and models holds equal place with those composed of useful models only.

With the wide spread increase in the use of the "Group System" in manual training has come a reaction against the exclusive use of the abstract exercise or of the course composed wholly of useful models. There has been felt a need for exercises at various stages. At the risk of repeating what some may already have read the writer wishes to quote from his discussion of this matter in Correlated Courses in Woodwork and Mechanical Drawing:

"The advantages of the group system are distinct. It permits class instruction and therefore minimizes the amount of demonstrating and talking the instructor must do by preventing needless repetition. By grouping a number of projects having similar tool operations it permits a boy to satisfy his individual needs without interfering with the orderly presentation of subject matter. It provides work for the fast worker of an interesting and profitable nature until the slow worker completes the minimum requirement. It provides for the repeater, who often has to repeat, not because of poor work in manual training but because of poor work in academic studies, by giving him choice of different models on which to work. In general, the group plan has the manifest advantages of class instruction at the same time making allowance for the individuality of the worker.

"One of the advantages of the group system is that it permits class instruction at stated intervals, thus reducing individual instruction to a minimum. For illustration a class beginning Group II would continue to work upon the problems of that group until all but the few acknowledged failures had completed the work required in that group. After this the class is to be instructed in the new things of Group III. This plan is to work thruout the whole course.

"The work of the groups will of necessity overlap each other. For, as soon as a pupil finishes one problem in a group, he begins another

problem in the same group, unless he is the slowest in the class. When the class is ready to begin a new group we are confronted with the question of whether to give the instruction belonging to the new group and allow the boys to proceed with the unfinished work of the old group, or to start them on problems of the new group. To proceed with the old is objectionable in that the worker forgets his new instruction before he has had time to apply it. To start the new work before finishing the old is bad in that the pupil will have lost interest in the old when asked to complete it after finishing the new work. Not to complete the old at all would be a practice too vicious to be tolerated for a moment.

"In the seventh grade this overlapping is not a serious problem, for the objects being small and quickly finished allow all to finish the old group before the instruction of the new has faded. In the eighth grade and high school, however, where the objects are larger, this objection is a serious one.

THE EXERCISE PIECE IN THE GROUP SYSTEM.

"As stated before, the aim of the group arrangement is to permit class instruction at the beginning of each group. To make this effective the practice and application must follow within a reasonably short time. Here the 'exercise' offers aid.

"If ever an exercise piece has a legitimate use, it has it here. The great objection to exercise pieces lies in their inability to create a vital interest on the part of the pupil. The writer has made it a practice to talk over the applications of each exercise and to state briefly the need for the exercise before beginning it. First, that the class because of numbers must be instructed all at the same time; second, that the joints, unlike the simple one-piece objects previously made cannot be remedied or patched up by reducing the size, as in the bread-board, when lack of knowledge or skill causes errors; third, that postponing the practice any length of time would be unwise. As the time required for making the exercises is short, in a properly arranged course, there need never be a lack of interest either in the exercise or in the unfinished objects of the old group to which some must return after completing the exercises.

"High school boys begin to take on a different attitude toward exercises and technic. Their increased knowledge and skill permit applications requiring considerable time for completing. For this reason all the exercises may be grouped in the fore part of their year.

"To the writer it seems unnecessary to apologize for this use of exercises. He has felt free to utilize parts of any system which seemed to serve his purpose. He does feel, however, that a long continued series of exercises in elementary woodworking without application would be fatal. American school methods have been criticised by Europeans as being superficial and lacking in thoroness. It may be that in our eagerness to develop the individual we have made ourselves subjects for such criticism to a certain extent. We need not fear the introduction of this small amount of drill and formalism, especially when there is no loss of interest and incentive."

The summary of the data obtained seems to bear out the assertions just made and may serve to reassure our anxious inquirer and any others in like quandary, that his practice is quite up to date as present practice goes. Let him call his practice *ecletic* and he will have placed manual training practice in the same category that educational philosophers have placed general educational practice. Confer Monroe's Textbook in the History of Education, page 747.

WRITING TABLE MADE BY STUDENTS IN THE JOHN MARSHALL HIGH SCHOOL, RICHMOND, VA.

CONSTRUCTION OF A GUITAR.

D. K. Hiett.

WHILE a project so unusual and difficult as the guitar here shown may not appeal to the average boy, still every teacher realizes that he occasionally has boys who have sufficient ability for, and who would derive a great amount of satisfaction from the successful completion of such a piece of work.

To insure success it is necessary that all material be carefully selected and the work done in a clean dry room, or at least, all the parts should be kept in such a place as much as possible. All the materials may be secured at musical instrument repair shops, or the wood parts may be selected from aged dry stock at a mill.

The sides and bottom may be of mahogany, maple, walnut, or oak; or birch which may be stained in imitation of mahogany. Walnut and mahogany are perhaps the better woods.

The sounding board should be clear dry white pine. Theoretically the grain of the sounding board, Fig. 1, should be fine on the side marked *X*, and gradually become coarser and more open approaching the side marked *Y*. If one has the lumber to select from such a board may occasionally be found, but a good quarter-sawed board will answer well enough. Some makers form the board a little thicker under the heavy strings.

The neck, Fig. 2, is best made of mahogany, and blocks for this purpose may be secured roughly cut to shape. The fret board, Fig. 3, is best made of ebony or walnut.

If a little judgment is exercised, quite a variation in size is possible, but it is generally conceded that the large instrument gives the better tone.

A form around which to bend the sides, Fig. 4, and a follow board to hold them in place while drying, should first be built. The form should be in two pieces held together by cleats as shown, in order that it may be removed after the glue blocks, strips, and bottom are in place.

The follow board should be made in four separate parts, and built up of one-inch boards held together by spacers as shown. In cutting the shape, allowance should be made for the thickness of the drum sides.

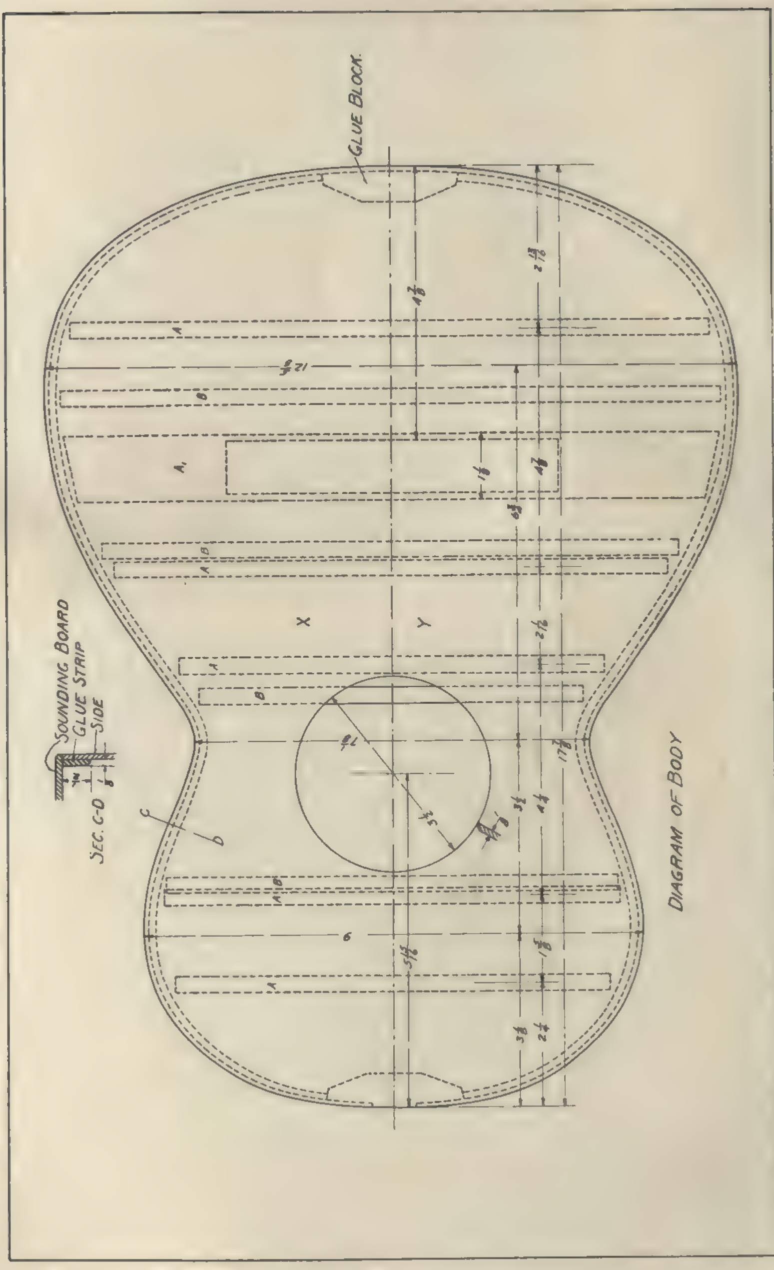


FIG. 1. DIAGRAM OF BODY.

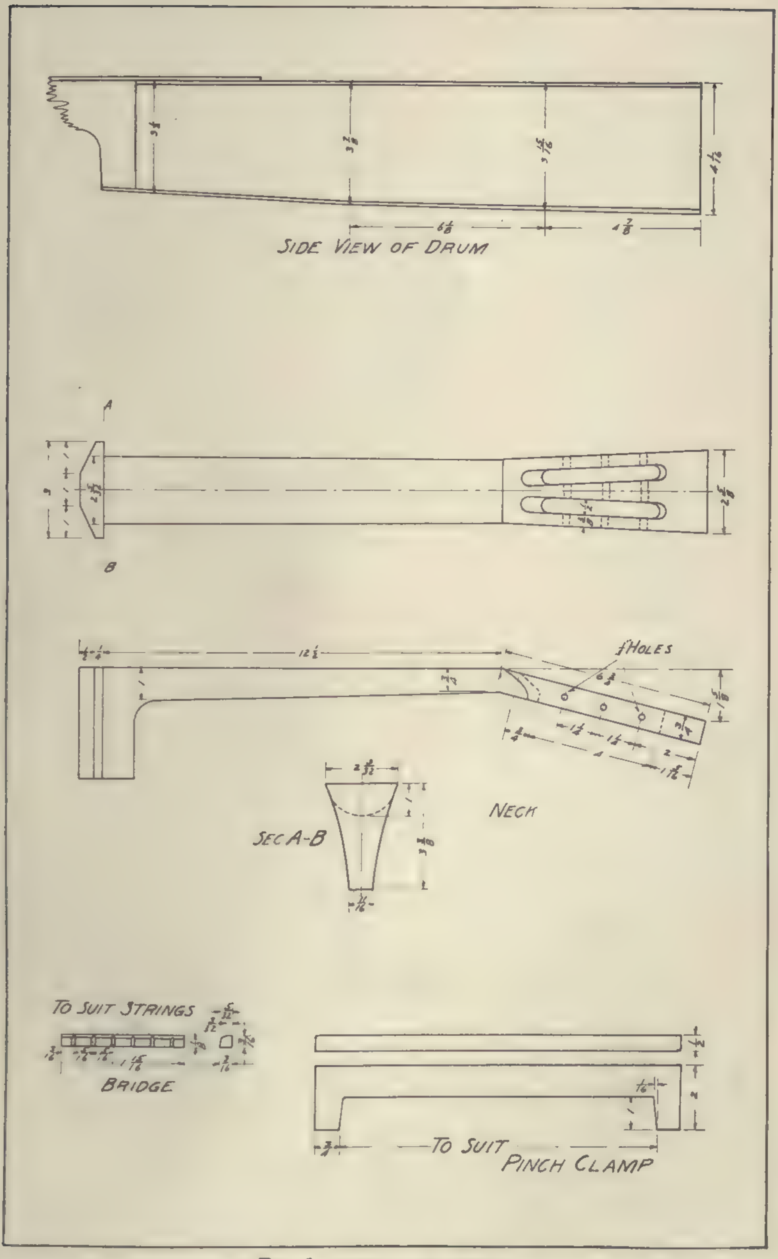


FIG. 2. DETAILS OF GUITAR.

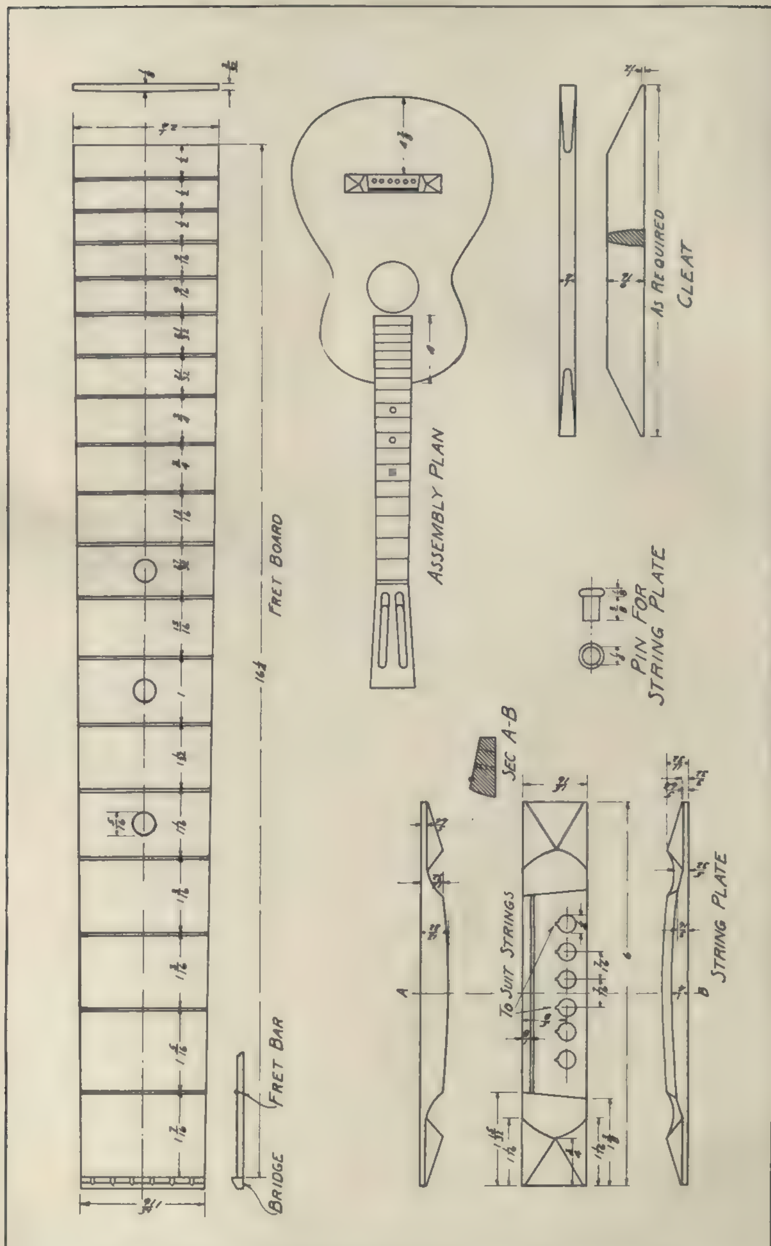


FIG. 3. DETAILS OF GUITAR.

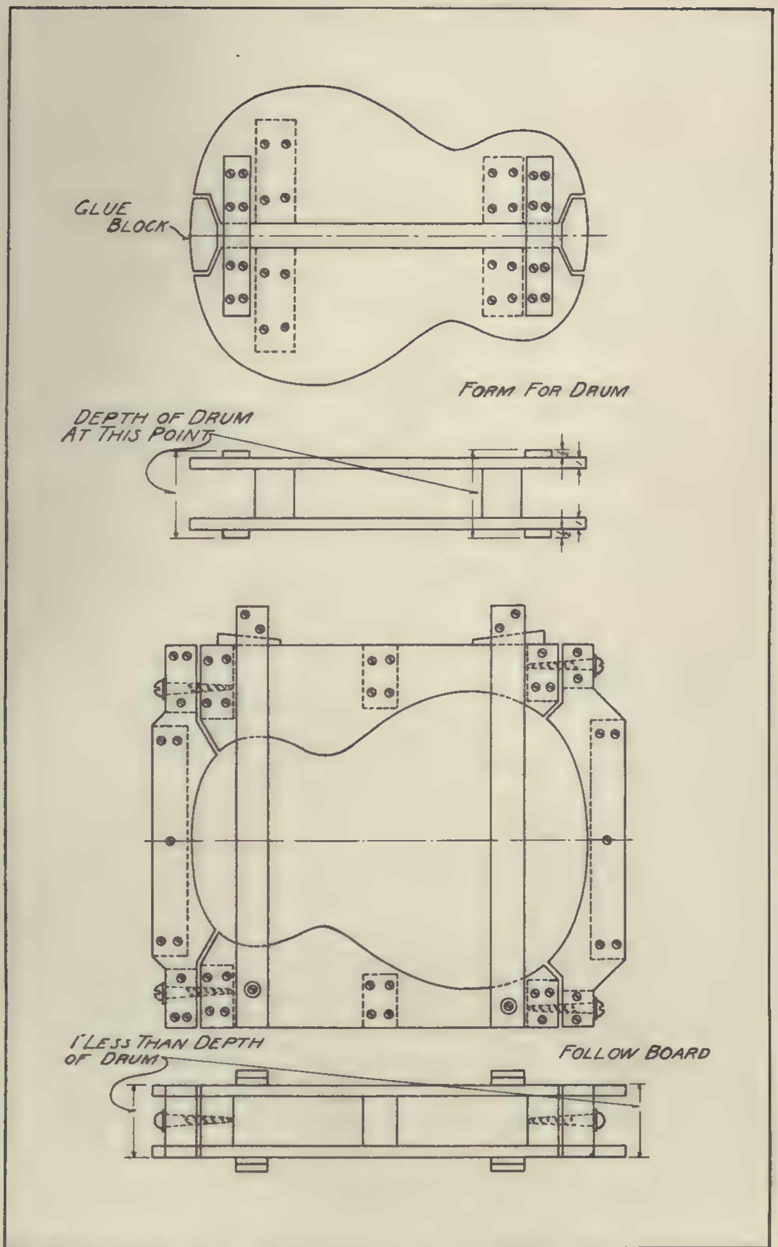


FIG. 4. FORM FOR DRUM, AND FOLLOW BOARD, FOR CLAMPING UP WHILE GLUING.

The two side members may be drawn in place by the bars and wedges as shown. Large screws will serve to draw the end members in place after the side ones are secured.

The side of the drum is in two pieces, and these pieces must be planed to give a good joint at the center line on the large end, but at the other end this is not so important as the joint is there covered by the extension on the neck. Ten minutes of dry steam should be sufficient for the sides, and about four days should be allowed for drying, after which the glue blocks and strips should be glued in place. These pieces are made of maple of the shape shown.

If the bars holding the follow board in place are about $\frac{1}{8}''$ away from the edge of the drum sides, the bottom may be slipped in under them and glued to the sides, pressure being secured by strips screwed to the follow board and pressing on the bottom. After the glue has dried, the forms may be removed, and the cleats, which should be of pine, glued to the bottom and the sounding board, and the sounding board glued in place.

The neck should now be glued in place and when dry, the fret board is put on, taking care to secure this piece well to the sounding board as this will stiffen the neck materially.

The cleats marked *A*, Fig. 1, are on the sounding board, and those marked *B* are on the bottom. The one marked *A* beneath the string plate is $\frac{1}{8}''$ thick.

A number of wooden pinch-dogs, such as the one shown in Fig. 2, are very handy for the light glueing.

The neck should be cut to shape roughly and allowed to dry as long as possible before the final finishing is done in order that it may change as little as possible when in place.

The fret bars may be purchased by the foot at repair shops, and cut to the desired lengths. With a bevel set square across the fret board, a slight cut with a knife should be made, after which the tongue on the bar is forced into place. Three ivory or celluloid disks set into the fret board where shown are very much appreciated by some players.

The string plate, Fig. 3, should be made of wood to match the fret board, and has a piece of the fret-bar let into it as shown.

Before boring the holes in the neck, the screw plates should be obtained and the holes located to fit them.

After staining and filling, a finish of shellac and oil should be applied, this being preferable to a heavy varnish.

THE RELATIONSHIP BETWEEN CONTENT AND MANIPULATION ILLUSTRATED BY WORK IN CONCRETE.

LEON LOYAL WINSLOW.

> **No little contribution toward our national prosperity will be that content with manual labor which should come from viewing it in school as a worthy end of intellectual study.**
>
> —RUTH MARY WEEKS.

IN genuine industrial education there are always manifest three phases, the social, the psychological, and the manipulatory. If any of these are missing, the type of education may be regarded as incomplete.

The problem of industrial education is, primarily, a social one. The teacher engaged in the work should, first of all, be a student of local industrial conditions. He will then discover existing relationships between individual and environment and will be able to bring about thru this discovery a proper adjustment, an adjustment which can not be brought about by reading, nor by reasoning. Personal investigation is required. And this means consultation with employer and employe; it means a mingling with the industrial as well as the educational world, and it requires a considerable amount of the teacher's time. And yet, if social efficiency is sought by our schools this time must be given. Too often teachers engaged in this work handle a subject with which they but think they are familiar. Familiarity with industrial education is familiarity with industrial life. This is not a matter of book instruction, especially since many of the methods employed apply to local conditions.

As teachers, we are dealing continually with individuals, changing, developing individuals whose needs today are quite different from those of tomorrow. Every industrial teacher has, in his shop, altho he may never have thought of it, a psychological laboratory where more vital information is available than can be found in all the libraries. The shop is the place for the application of psychological principles and for the working out of new ones. Here, the learning process can best be studied and comparisons made between machine tool and hand tool methods; here the significance of machine work in the learning

process can be determined, that machinery may perform its proper function in education; and here the relationship between explanation and demonstration can be discovered.

In most localities, even in the elementary school, more actual manipulation of materials should be undertaken. Yet there is always something to be considered above and beyond the manipulation of materials, important as this motor activity may be. Industrial work, if it is to be education at all, must prepare for living as well as for livelihood. It should most certainly include manipulation, but along with it there should be a vast amount of content or subject-matter reaching out into various related fields.

This interpretation of method has been accepted by many of our best industrial schools. But, under the present organization of our public school system the content value of our manipulatory courses is, for the most part, if not entirely, missing. The shop teacher may remedy this fault if he will assume a greater responsibility, a task which unquestionably has the compensation, however, of being worth while, that of teaching a large amount of content as well as manipulation. If this work is not done in the shop it is evident that it is not going to be done at all. If content is put aside the entire course, when weighed in the scale of educational values, will fall short.

In a certain city in New York state an eighth grade recently took up the study of cement and concrete. Instead of mere manipulation, without understanding, the figuring, planning, measuring, and making all grew out of a knowledge of and an appreciation for the materials.

The attention of the class was called to concrete structures located in the vicinity of the school, among which were a factory, a railway bridge, a fence, and many concrete sidewalks. The reason for the popularity of the material was investigated and its advantages over other materials for certain kinds of work were learned. The interest having thus been aroused, assignments were given out, each member of the class being asked to investigate some particular phase of the industry. Several books and magazines bearing upon the subject in hand were collected by the instructor and by the class. These were placed upon the shop book-shelf.

The following subjects were assigned, there being twenty-two pupils in the class: 1. Present day uses of concrete. 2. What concrete is; its advantages. 3. The place which cement and concrete have occupied in history. 4. Old method of making cement. 5. How cement rock

is obtained and prepared. 6. The making of Portland cement from river mud. 7. The rotary kiln. 8. The ball mill. 9. Requirements of fine and of coarse aggregate and of water. 10. The rich, standard, medium, and lean mixtures, and where to use each. 11. The cost of Portland cement, sand, and gravel. 12. The mixing of concrete by hand. 13. The batch mixer and the continuous mixer compared. 14. The rotary batch mixer and the automatic batch mixer. 15. The continuous gravity mixer and the continuous Drake mixer. 16. The concrete form. 17. The placing of concrete including reinforcing. 18. Setting and seasoning. 19. The cement gun. 20. Strength of various mixtures; compression and tension. 21. Artificial coloring of concrete. 22. Influence of temperature, electricity, fire, and water upon concrete. Each member of the class was assigned that subject which, in the opinion of the instructor, was best suited psychologically to his needs. Assignments 3, 4, 5, 6, 7, and 8 required reading almost exclusively; assignments 9, 10, 18, 20, 21, and 22 required experience and called for the performing of an experiment; while assignments 11, 12, and 18 were subjects for inquiry and personal investigation. Those to whom assignments 4, 5, 7, 8, 13, 15, and 19 were given might draw a diagram to help in their explanation of the kiln, drier, ball mill, cement gun, and concrete mixer. Materials were furnished those who performed experiments.

After each boy had reported upon the part which he had undertaken, he was asked to write what he had learned. The papers were handed to the teacher of English composition who looked them over as compositions, this work being credited in the composition class where time was allowed for writing. Later, six of the boys who had written good papers and had displayed the most energy were chosen as editors of the combined class paper which it was decided should be called, "A Study of Cement and Concrete". The duties of these editors included the rearrangement of material and the writing of an introduction to the paper and of connecting paragraphs and sentences.

The content work was carried thru several shop periods, a little time each day being given to it, while the class was finishing previous problems in manipulatory work. This was completed, however, at the time to take up the making of the concrete forms.[1]

[1] No reference is made here to the actual mixing and manipulation of materials as this aspect has been fully treated in "A Study of Concrete Construction," by A. F. Siepert, *Manual Training Magazine,* December, 1911, p. 106.

Forms were made both of wood and of metal. Several boys made jardinieres; others, window boxes, garden benches, etc. One boy made a monumental cross for his dead sister's grave, an idea which was taken up by another member of the class. But the masterpiece from the boy's point of view was the dog's house, large enough to involve practical problems of mixing and of reinforcing. The house was cast in one piece, the owner crawling into it to pull off the boards of the inside form.

At the close of this work with concrete each member of the class had made some finished article. From an industrial standpoint many of these were satisfactory; they were fair in workmanship. But the purpose of this paper is not to place emphasis here but rather to point out that in this case the finished project was representative of more than the acquisition of technique or skill; it stood for content as well as for manipulation. It had, tied up with it, the social, the psychological, and the manipulatory phases and was a product of real industrial education.

CONTRACTOR, TENANT, AND HOUSE.

ROOMS IN PAPER.

PROBLEMS IN CONSTRUCTION AND DESIGN.[1]

VIII.

NAMA A. LATHE AND ESTHER SZOLD.

THE DRESSER.

THE construction of the main frame of teh dresser is similar to that of the chiffonier. The variations of the pattern which would be necessary in order to make sliding drawers have also been shown in the patterns for chiffoniers. *

SPECIAL FEATURES IN CONSTRUCTION.

Fig. 42 and Fig. 41A.

Design:—The design for the arrangement of the drawers should be made and the drawer-faces cut out and applied before the frame is pasted, as explained in the directions for the chiffonier. Note that the dressing cases which appear in the design for the front of the dresser do not extend to the actual front of the dresser. See Fig. 41A. If the original design for the front of the dresser calls for larger or smaller dressing cases than these, the size of the mirror will be altered, since the supports for the mirror are fastened to these cases. The width of the mirror is determined by measuring the distance between the dressing cases and subtracting $\frac{1}{8}''$.

FIG. 41A.

Order of Pasting:—Paste the drawer-faces in place upon the frame.

Make the dressing cases, apply their drawer-faces and paste them in place upon the corners of the top. See Fig. 41A.

Paste the frame in shape.

[1] Copyright by Nama A. Lathe and Esther Szold.

* See October, 1913, number, page 35 and following.

Fold and fit the top ledge to the top of the frame. Paste.

Mirror Supports:—Prick pinholes as indicated on the mirror supports. Place the supports so that the pricked strip turns forward and adjust at the inner corners of the dressing cases. See Fig. 41A. Paste them in place carefully so that the folded midrib of each support is exactly vertical.

Back:—The back of the frame comes just to the top of the dressing cases. Paste in place.

The Mirror:—The back of the mirror is a shallow tray which, in the finished dresser, is placed upright with its rim turning back. Before this tray is pasted cut silver paper ¼″ shorter and narrower than the tray and mount it carefully on the center of the tray on the unmarked side of the paper.

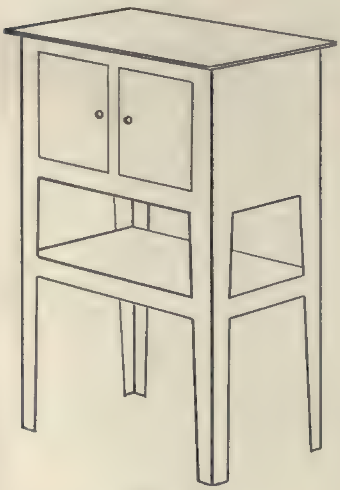


FIG. 43A.

Cut out and stain the mirror frame; mount it to cover the edges of the silver paper.

Paste the rim of the tray.

Hang the mirror by thrusting the shanks of a paper fastener thru each support where pricked and thru the holes pricked in the rims of the mirror back. Spread the shanks slightly to hold them in place.

Legs:—Strengthen the legs by pasting folded strips of paper in the angles.

Brace:—The brace spans the center of the frame at the base to prevent bulging. The laps turn down and are pasted to the front and back of the frame.

THE CABINET TABLE.

See Fig. 43 and Fig. 43A.

The construction as given is simple and variations in design or proportions may be undertaken readily.

If it is desired to make the cabinet with doors that may be opened, draw the face with the doors in place. Rule lines ⅛″ inside the door

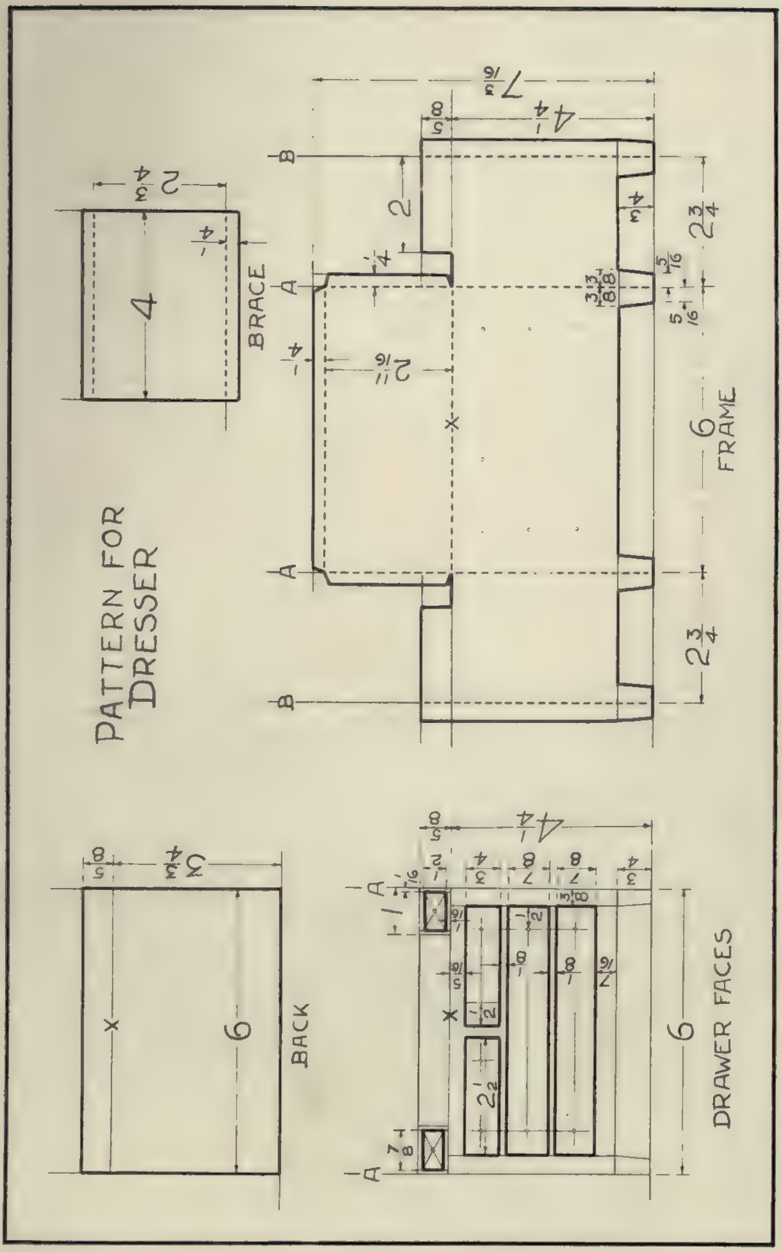


FIG. 41.

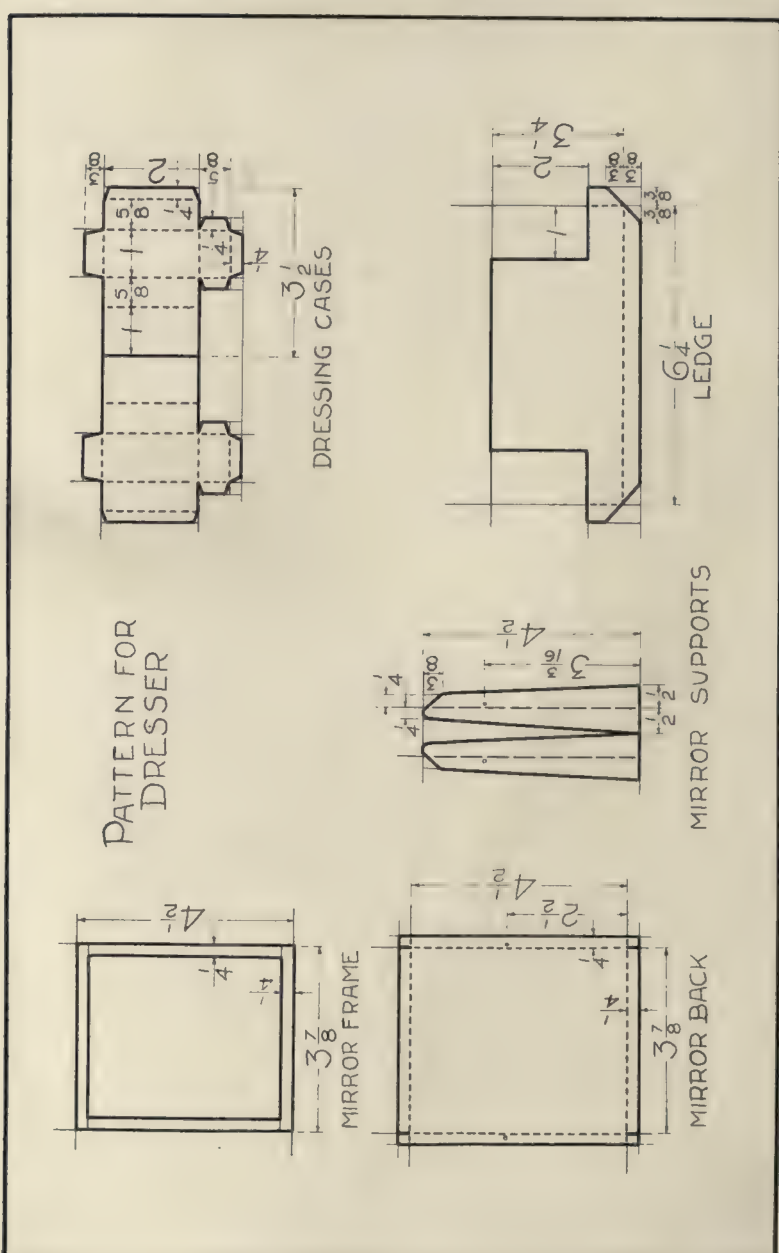

PATTERN FOR DRESSER
DRESSING CASES
LEDGE
MIRROR SUPPORTS
MIRROR FRAME
MIRROR BACK

Fig. 42.

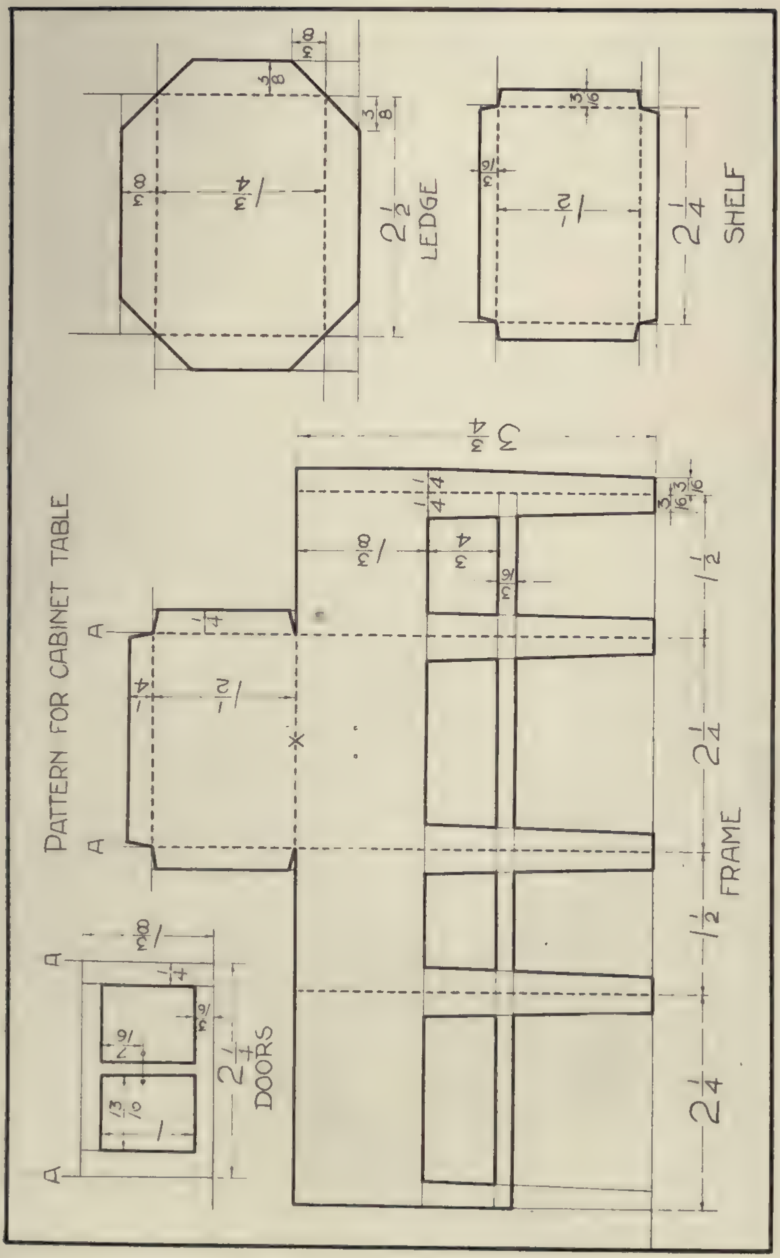


Fig. 43.

spaces, except on the hinge sides where $\frac{1}{4}''$ hinges should be left. Cut door-faces and attach as described in the construction of the Buffet.[1] Construct a second shelf like the one shown in the pattern and paste it with the laps turning down just at the base of the cabinet section.

Order of Pasting:—Paste the doors on the face.

Paste the frame into shape.

Spread glue on the inner surface of the shelf-rail. Hold the shelf with the laps turning down and push it up into place inside the shelf-rail.

FIG. 44A.

THE DESK.

See Fig. 44, Fig. 44A and Fig. 44B.

Plan and apply the drawer-faces.

The Top:—Paste the laps at the top and sides of the section above line Y to form a standing rim on three sides of the enclosed oblong.

Protection Rail:—Fold forward and paste in place the $\frac{3}{16}''$ strips above Y, extending across the back and side sections of the frame.

Oblique Laps:—Fold the laps along the sloping edges of the side sections. If they overlap the doubled edge at the top, cut off enough from the end of the lap to make it fit neatly. Paste in place.

Pasting:—Paste the sides of the frame in place. Leave the back loose until after the pigeon holes are in place.

Pigeon Holes:—See Fig. 44B.

Paste the pigeon hole patterns to form deep boxes open at the front. The broad laps fold back making the upright portions of the boxes of double thickness.

[1] See February, 1913, number, page 237.

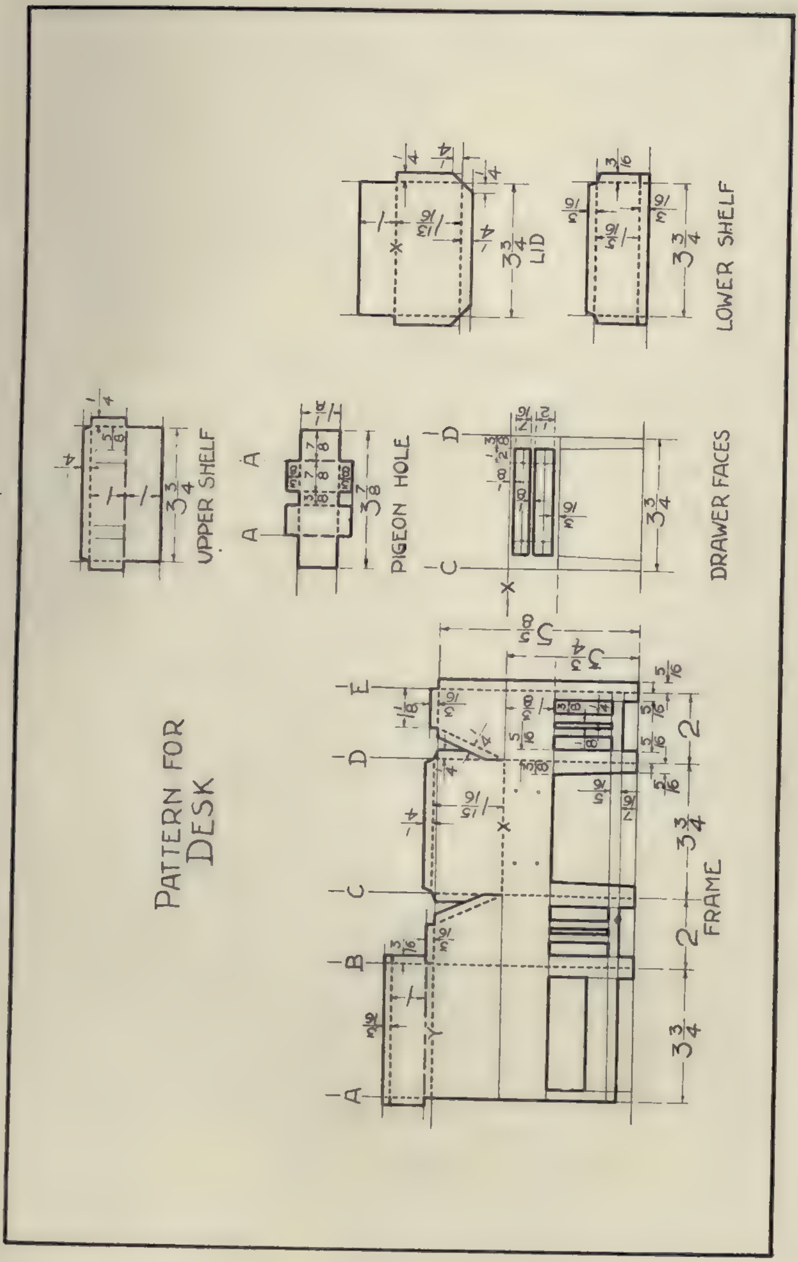

PATTERN FOR
DESK
UPPER SHELF
PIGEON HOLE
DRAWER FACES
LID
LOWER SHELF
FRAME

FIG. 44.

Fold the large equal oblongs of the upper shelf upon each other, paste together.

Paste the pigeon holes against the under side of the shelf where indicated.

Slip this structure into the frame from the back, note its position and remove.

Spread glue on the side laps of the shelf and on the bottom of the pigeon holes, slip carefully into place. Press in place until the glue dries.

Back:—Close the back and paste it in place.

Top Shelf:—Note that the top shelf falls just below the laps on the side section. Push up the top, spread glue below the lap on each side section and push the top shelf down into place.

Lid:—Double the laps on the lid and paste. The section above X on the lid is slipped back into the desk until it touches the pigeon holes. See Fig. 44B. Paste in place.

Push the shanks of a paperfastener thru the middle of the lid and just inside the doubled edge to serve as a knob. The opened shanks of the fastener may be turned to hold the lid shut as in Fig. 44A.

Shelf:—Paste the lower shelf in place against the back rail and the lower rail of the sides. See Fig. 44A, and Fig. 44B.

(*To be continued.*)

Fig. 44B.

EDITORIAL

IT must be clear to every observer that there are at the present time two rather strong tendencies in the preparation of teachers of the manual arts. One of these is toward a four-year college course and the other toward the selection of men from the industries. At first sight these may seem to be tendencies in opposite directions, but a closer study of the demands and of the ideals of the men who are making them would seem to indicate that a truer interpretation of these tendencies is that they are essentially one—a demand that the teachers of manual arts in the future be men who know the technique of their subject thoroly and at the same time posesss a general education which is represented by the bachelor's degree. To us this seems like a healthy sign of the times. If the manual arts are to take their place alongside of science and mathematics and language in the high schools, as they are certainly doing in some places, the men who represent these arts must be able to take their places in general school activities on exactly the same social and intellectual plane as the representatives of the older subjects. It is to be taken for granted that the manual arts teacher need not know as much science or as much mathematics or as much language as the respective teachers of these subjects, but he must have the intellectual power and the breadth of vision and culture that are supposed to be common to all of these teachers. And while there is no royal road to such a general education, and we know that it may be obtained entirely outside of college walls, yet the common standard of estimate for such education is the bachelor's degree.

A College Course for Teachers of Manual Training

While the bachelor's degree is quite generally accepted among educators as a standard of culture it does not stand for any specific section of knowledge. And right at this point is the opportunity for the college course in the preparation of teachers of the manual arts. Just as there are college courses in general science, and engineering, and pedagogy and agriculture and domestic science and many more, so there may appropriately be college courses in the manual arts and the pedagogy pertaining to these arts. Again, just as the special subjects of engineering or agriculture or domestic science are often allotted from one-half to three-fourths of the entire time of the course, so it is appropriate that

the special manual arts subjects be allotted a similar amount of time provided such subjects are well organized and thoroly taught.

In this connection it is significant that a group of men from ten institutions in the Mississippi Valley engaged in training teachers of the manual arts should recently discuss and look with favor upon a four-year college course which would devote one-half of its time to subjects in direct preparation for teaching the manual arts. The adoption of such four-year courses by normal colleges and by universities would not do away with the present two-year courses which are found in several institutions of learning, but it would provide a course which more nearly expresses the ideal preparation for teachers of the manual arts, and a preparation which, so far as its cultural elements are concerned, is being demanded by the certificating laws in several states.

While such a four-year course is an important step forward it might not be so regarded from the manual arts standpoint if it were not accompanied by an effort to make the manual arts courses richer on their practical side. If this demand for college-trained men to teach the manual arts were to mean getting farther away from the industries we would be quick to help raise a danger signal, but just as the best college courses in agriculture have kept close to science on the one hand and to the farm and the farmer on the other, and thereby improved both education and farming so it is believed the present tendencies in manual arts instruction will benefit both education and the industries. The college is going to learn from the industries and ultimately the industries will reap new benefits from the instruction in the colleges. At the present time no one can do more than prophesy as to just how the colleges and the industries are going to come closer together in this work—whether it will be by establishing industries within the colleges or by sending college students into the industries, or by taking groups of industrial workers into the colleges as students, or by employing expert industrial workers as college teachers, or by all or several of these. Whichever is the one to be most commonly accepted or whether none or all of these will appear in the final solution of the problem, the fact seems clear to us that the tendency toward a four-year course and that toward inducing more men who have learned trades to become teachers may be appropriately regarded as phases of the same problem—namely, to strengthen the work in the manual arts all thru the schools by sending out as teachers men who are better trained intellectually, pedagogically, and practically. —CHARLES A. BENNETT.

The Demand for Teachers

Ten educational institutions, which include in their organization departments for the training of teachers of the manual and industrial arts, were represented early in December in an informal three-day conference called to discuss questions which the present insistent demand for such teachers is bringing prominently to the front. The character and geographical distribution of these institutions are significant:

Bradley Polytechnic Institute	Peoria, Illinois
Iowa State Teachers College	Cedar Falls, Iowa
State Normal School	Terre Haute, Indiana
Illinois State Normal University	Normal, Illinois
Kent State Normal School	Kent, Ohio
George Peabody College for Teachers	Nashville, Tenn.
Ohio State College	Oxford, Ohio
University of Chicago	Chicago, Illinois
University of Missouri	Columbia, Missouri
University of Wisconsin	Madison, Wisconsin

At the close of the last session, the conference unanimously agreed that the problem of securing a much larger number of professionally trained teachers of the manual and industrial arts in the near future is one which has a genuine social significance and that every legitimate means should be taken to bring to public attention both the need of training such teachers and the excellent opportunities open to the individual who will prepare himself for this service.

With this social need and this opportunity for individual advancement clearly in mind, the following statement of facts was made:

(1) There is a well-defined and insistent demand for trained teachers of the manual and industrial arts which, at the present time, greatly exceeds the total supply of such teachers from all sources. It is the common experience of all institutions training these teachers that they are unable to supply, or even to recommend candidates for many of the positions which they are called upon to fill. A considerable number of such positions go unfilled for a time or are given to men inadequately trained or even wholly without special preparation for such work.

(2) A careful examination of all available statistics will show that the salaries paid to manual arts teachers are higher than those paid for other school work demanding an equal amount of preparation. In fact the records of one institution show that teachers graduating from

the two-year course in the manual arts receive a higher average beginning salary than that received by the graduates of four-year courses in other departments of school work. While, from one point of view, this is a fact to be regretted, since thoro preparation for any teaching position is greatly to be desired, yet there is much promise in the present situation which makes it possible for energetic and ambitious young men to enter the teaching profession early and to work their way up while continuing their training, for the new work demands constant study and progress.

(3) Not only is the initial salary higher for manual arts positions but the opportunities for advancement are exceedingly good. With the rapid extension of vocational education, under the stimulus of state aid, a great variety of positions is being created in which initiative, originality and hard work are demanded, but which are properly rewarded by rapid promotion.

(4) While any high school graduate possessing the necessary personal aptitudes and characteristics will find the opportunity, as above stated, unusually good, the student from a good technical high school who has taken a liberal amount of mathematics and science will find himself especially well equipped to take up this work and to secure a good position as teacher of the manual and industrial arts in a high school.

(5) The need which is felt by most industrial schools for the services of teachers with considerable practical shop experience offers unusual advantages to young men who, after a fairly good school training, entered some skilled industry three or four years ago. In most of the institutions now training teachers of the manual arts, such practical shop men will find an opportunity for securing a good preparation for positions in the new industrial schools, and can be entirely confident that there will be a demand for their services after a relatively brief period of professional training. —F. M. LEAVITT.

Dr. Alwin Pabst

In the spring of 1899 Dr. Alwin Pabst was chosen to succeed the lamented Dr. Woldemar Götze as director of the School for the Training of Teachers of Handwork, Leipzig. In addition to years of successful experience as a teacher of handicraft and science, especially physics, and of various forms of industrial work into which his interest in physics carried him, he brought to the new position marked ability as a public speaker, great energy, and personal qualities that immediately commanded recognition.

He has been a prolific writer, and thru his writings he has exerted a great influence on the development of education in Europe. He has contributed numerous essays to educational and scientific journals, and has written books on the teaching of physics, clay modeling, and other handwork subjects.

He is best known in America as the author of "Handwork Instruction for Boys" (*Die Knabenhandarbeit in der heutigen Erziehung,* 1907), which has been translated into English, and as editor of "Papers on Handwork for Boys" (*Blätter für Knabenhandarbeit*). Dr. Pabst visited the United States in 1904 and was received with marked respect and enthusiasm. He has also traveled extensively in Switzerland, France, England, and Holland, and he has in his articles endeavored to make his experiences and observations available to his colleags and students. This is the motive for a long list of essays in the best German periodicals which have resulted in bringing his name and his ideas before a vast circle of readers. He has been in demand as a speaker at innumerable conferences and teachers conventions, and has thus been able to exert a wide personal influence. Because of his keen sympathy in the work of the arts and crafts he was chosen president of the Leipzig Union of Artistic Craftsmen.

A biographical sketch in "The Manual Training Teacher", published in London, concludes with the following paragraph:

"To sum up, we must accord to Dr. Pabst the recognition that he has not only successfully labored to train capable and intelligent teachers of handicraft, but that he has largely contributed to the work of securing for the idea of practical technical education the recognition of its deeply rooted mental and moral foundation and its far-reaching national importance. He has, moreover, placed it in much closer touch with all other pedagogic movements. And this is no small service."

The following statement is translated from a recent German sketch:

In the years 1908 to 1912 Dr. Pabst published the following works:

Practical Education (*Praktische Erziehung;* Leipzig, Quelle & Meyer).

Modern Educational Questions, A Collection of Lectures and Essays (*Moderne Erziehungsfragen, eine Sammlung von Vorträgen und Aufsätzen,* Osterwieck, A. W. Zickfeldt).

Practice in Schools of Handwork. (*Aus der Praxis der Arbeitsschule,* Osterwieck, A. W. Zickfeldt).

The magazine "Papers on Handwork for Boys" (*Blätter fur Knabenhandarbeit*), edited by Dr. Pabst since 1899, appears since

January, 1912, in enlarged form under the title "The School of Handwork" (*Die Arbeitsschule,* published by Quelle & Meyer in Leipzig), and is developing more and more into the leading organ for all efforts toward reform which, proceeding from the principle of handwork, is now maintaining its hold on the interest of the pedagogical world in Germany.

The energetic and untiring activity of Dr. Pabst has been recognized in many ways by the authorities, and in the person of its promoter the cause itself has at the same time been distinguished and honored. The Duke of Anhalt, in the service of whose school Dr. Pabst had spent some years earlier, bestowed upon him the golden "Order of Merit for Art and Science" (*Verdienstorden für Kunst und Wissenschaft*); the King of Saxony gave him the title "Professor", and the German Emperor distinguished him thru the "Red Eagle Order" (Roten Adlerorden). Thus here also it is shown that unselfish work, which must struggle for years for recognition, finally succeeds and finds its reward. —WILLIAM T. BAWDEN.

A few days ago we received a letter from the supervisor of manual arts in a western city which seemed to us to be a fine response to the "Competition" announced in our December number. In this letter the supervisor spoke of drawings he was planning to send us, and then added that his decision to enter the contest was not due to the prizes so much as to the desire to contribute to the manual training field some of the "well-proportioned and pleasing problems" which he had used with success in his city. This supervisor's idea of the competition is precisely the same as our own. The chief satisfaction to the winners will not be in the money prizes nor even in the professional advantage that may come from winning in such a contest, though both of these may count for something, but their real satisfaction will be in having been successful in contributing something of recognized value for the good of the cause. We hope many more such men will be heard from before the twentieth of February when the competition closes.

The year 1914 is just the right time to make plans to go to San Francisco in 1915 and to Paris in 1916, or to one of them if not to both. If Director James E. Barr of the Department of Education of the Panama-Pacific Exposition gets the support he deserves, he will present to American educators the most valuable display of school work ever seen on American soil, and in that display the manual arts will be a

very large factor. And there is every reason to believe that the great arts and crafts exposition being planned by the French government to be held in Paris in 1916 at the same time as the International Art Congress will attract more teachers from America than have ever attended any previous session of the Congress. This double attraction is sure to appeal to many manual training teachers who have not attended the Congress in years past.

DEATH OF DR. C. M. WOODWARD

While the page forms of this issue were being made up we learned of the sudden death of Dr. Calvin M. Woodward of St. Louis, the great champion of manual training. On that account we had time to prepare only a very brief notice for this number. Later we shall speak of Dr. Woodward's influential life and his great contribution to education.

Early in January Dr. Woodward went on a lecture tour thru Southern Missouri, some of the time giving as many as three lectures a day. On Saturday afternoon, January 10th, he was stricken with paralysis, and on Monday afternoon, January 12th he died at his home in St. Louis. The physicians in attendance stated that his death was indirectly caused by overexertion on the lecture tour. The funeral services were held at the Church of Unity of which he has long been a vitally active member, and was attended by officials, alumni and students of Washington University, the Manual Training School and Smith Academy, as well as many other friends and public school officials. Altho seventy-six years old at the time of his death, Dr. Woodward was active in his work up to the Saturday he was stricken. He had plans for a lecture tour in Texas an dan appointment to speak at Bradley Polytechnic Institute. He has been a vigorous, untiring worker and leaves a noble record of achievement behind him. His rugged physique he attributed to outdoor exercise. In his college days at Harvard he was a member of the crew, and habits formed then were not dropped. At the time of his death he was professor emeritus of Washington University.

ASSOCIATIONS

BOSTON MANUAL TRAINING CLUB.

The members of the Boston Manual Training Club enjoyed a very profitable experience in a visit, on November 29th, 1913, to the Derby Desk Company, Somerville, Massachusetts, and inspection of this large woodworking plant. The desks and office furniture manufactured by this Company go to all parts of the world.

The regular meeting of the Club was held on Saturday evening, December 6th, at the Franklin Union, Boston. The entire time was taken up with a discussion of the preliminary report of the Educational Committee, on "The Place of Manual Training in the Educational System."

The main topics under discussion were:

1. The present status of manual training.
2. The function of manual training in a system of education.
3. The teacher.
4. The teacher's salary.
5. Equipment.
6. Size of classes.
7. The amount of time given to manual training.

A number of special meetings are to be held for the discussion of this report before the subject matter is made public.

ANNUAL DINNER.

The Club held its annual "Get-Together" Dinner at the Boston City Club on Saturday evening, December 20th. A large number of men were present, including many school superintendents of Greater Boston.

The speakers were Henry Turner Bailey, editor of "The School Arts Magazine;" Meyer Bloomfield, director of the Vocation Bureau, Boston; and Robert O. Small, deputy commissioner of education for Massachusetts. All three of the speakers are members of the Club.

Mr. Bailey spoke on "The Curves in their Relation to the Manual Arts." The address was a strong one in which a plea was made for a study of design in the manual arts, based on lines from nature, and a study of past masters of the crafts, as an inspiration to the pupil. Emphasis was given to the tragedy of separating our system of education from real life.

Mr. Bloomfield spoke on "The Function of Vocational Guidance," and called for the cooperation and assistance of the manual training men. He considered that the manual training teacher would make an ideal person for work along the lines of vocational guidance.

Mr. Small spoke on "Vocational Education," and emphasized the fact that the movement needs the hearty and intelligent cooperation of all manual training teachers and supervisors. He pointed to the fact that there is at present much

misunderstanding and confusion of terms; that we must first understand the aim and know the content of our problem before we try to solve it.

HARRY L. JONES,
Somerville, Mass.,
Chairman of Press Committee.

DEPARTMENT OF SUPERINTENDENCE.

The preliminary announcement of the program of the meeting of the Department of Superintendence at Richmond, Va., February 23rd to 28th, 1914, shows that considerable attention is to be given to the problems that interest the readers of this Magazine.

On Tuesday evening Dr. Edward T. Devine is to discuss "Sociological questions in school cooperation." On Wednesday morning Dr. David Snedden, Commissioner of Education for Massachusetts, and Professor W. C. Bagley, University of Illinois, are to discuss "Distinctions between vocational and cultural education." The Wednesday afternoon session is to be devoted to part-time, continuation, shop, and trade schools, and the speakers are Superintendent R. J. Condon, Cincinnati, O.; Superintendent H. P. Hughes McComb, Miss.; F. W. Thomas, Supervisor of Apprentices, A. T. and S. F. Ry., Topeka, Kan.; Superintendent Lewis Gustafson, Rankin School of Trades, St. Louis.

On Wednesday evening the United States Bureau of Education is to present a program on the "Condition of Rural Schools." Papers will be presented by Mabel Carney, Illinois State Normal University; Josephine C. Preston, State Superintendent of Public Instruction, Olympia, Wash.; Susie V. Powell, Jackson, Miss.; and Cora Wilson Stewart, Moorehead, Ky.

The official headquarters will be at the Hotel Jefferson, while the commercial exhibits will be displayed at the Murphy and Richmond Hotels. The chairman of the local committee in charge of arrangements is Joseph Saunders. Most of the meetings will be held in the city auditorium, the high school building, or the Hotel Jefferson.

There are many places of historical interest in the neighborhood of Richmond and plans are being developed which will bring as many as possible of these within the reach of visitors to the convention. A program bulletin is to be issued which will contain full details.

The Southeastern Passenger Association in whose territory Richmond is situated has granted a round trip rate of practically 1½ cents per mile. This Association has made a proposition to the adjacent passenger associations, and it is hoped that a satisfactory adjustment of the question of the railroad rates will be effected.

SCHOOL CRAFTS CLUB.

The second meeting of the year was a round table discussion held at Peck's restaurant, 140 Fulton St., New York City, on Friday evening, December 12, 1913.

The subjects and leaders of discussion for the tables were as follows: (1) Supervision, E. G. Traua; (2) Elementary Shopwork, James McKinney.

INDIANA SCHOOL SUPERINTENDENTS.

An important conference on vocational education was attended by superintendents and principals of Indiana at the Claypool Hotel, Indianapolis, November 6th to 8th, 1913. The Thursday evening program consisted of an address by Charles A. Bennett, Bradley Polytechnic Institute, on "The Meaning of Vocational Education from the Viewpoint of: (1) The State; (2) The Industries; (3) The Worker; (4) The School Men."

On Friday morning Superintendent T. F. Fitzgibbon, Columbus, discussed "The aim and scope of prevocational work in the regular schools." Dr. W. F. Book, state supervisor of vocational education, presented an outline of the difficulties encountered in the organization and prosecution of the prevocational work in the regular schools and indicated the best methods of meeting these difficulties. Superintendent H. L. Smith, Bloomington, gave an address on "The vocational survey as a first step in the organization of a special vocational department or school."

The Friday afternoon session was devoted to a consideration of what shall constitute a state aided vocational school or department, with the following speakers: Equipment, Superintendent L. J. Montgomery, South Bend; Course of Study, Z. M. Smith, state supervisor of agricultural education. The standardization of high school work was discussed by A. O'Neal, state high school inspector, and some practical problems of vocational training by Professor Bennett.

The Saturday morning session was taken up with a discussion of the Indiana law, the kinds of schools that may be established under its provisions, the organization and administration of such schools or departments, and other related topics. The leaders of the discussion were: John A. Lapp, former secretary of the Commission, and Superintendent J. H. Tomlin, Evansville.

The conference was largely attended and the superintendents who were present were unanimous in their opinion that it was decidedly worth while.

At this conference the State Department of Public Instruction distributed a circular entitled "Present Status of Industrial and Vocational Work in Indiana." This circular contains a brief summary of the provisions of the Indiana law, together with a statement of such rules and regulations governing the development of prevocational work in the regular schools as have been determined upon by the Board. A statement is also given of questions that are still held in abeyance. In a similar way a preliminary statement is made of rules and regulations governing the vocational work for which state aid is provided beginning in September, 1914.

The circular concludes with the following statement of principles which have been adopted by the State Board of Education to assist in the attempt to work out the problem of vocational education for Indiana:

STATEMENT OF PRINCIPLES.

1. For all professions, vocations, or callings, there is needed a general educational basis to which the first six years of school work should be devoted almost exclusively.

2. Some professional work, including a study of the special branches which underly a profession or vocation, is needed if the learner expects ever to become highly skilled in the work or expects to make a wise and intelligent choice of an occupation.

3. This more general study and prevocational work must be followed by a period of special study and participation in the profession or craft itself if real efficiency or skill in that vocation is to be acquired; to become a skilled carpenter, the boy must first of all study carpentry and not something else.

4. All vocational work must be done in and thru the instrumentality of the public schools by such an enlargement and extension of its departments and work as shall be necessary to provide real vocational education for all.

5. The prevocational work carried on in the regular schools and the special vocational work to be provided for in special departments and schools should not supplant but supplement and extend the present work carried on by our public schools.

6. The prevocational work to be done in the regular schools (Section 5) should be taken up in the more fundamental and basic industries which never go out of date and be so conducted as to vitalize the regular school work and give a proper basis for the real vocational work to be done in special vocational departments and schools.

7. A helpful preparation for any specific training in a vocation would be such a study of the industries and life of our people as will make the workman comprehend his work in its scientific relations and in its historical, economic, and social bearings; a study which would tend to give the workman a right view of his trade or work and of his powers and duty as a citizen and member of society.

8. In general, special vocational training should not begin much before 16, because the child is not well enough developed before that age for work in any skilled industry.

9. The problem of vocational education should be approached from the standpoint of the welfare of the individual to be trained for useful citizenship, rather than from the standpoint of the vocations and industries to be benefited by the skilled workers to be produced.

10. The whole problem of vocational education as it pertains to conditions and needs in Indiana must be thoroly investigated to the end that a school organization or plan be devised that will solve, in an economical and efficient way, the problem of general and vocational education in Indiana.

MONTANA INDUSTRIAL EDUCATION ASSOCIATION.

At the Montana State Educational Association meeting, which was held at Helena, November 24th to 26th, 1913, the manual training teachers present organized the Montana Industrial Education Association. All the members who were present were very enthusiastic over the new organization, and a successful year is anticipated. The officers elected are: president, E. M. McGrath, Helena; vice-president, H. A. Sikes, Helena; secretary, A. S. Peterson, Bozeman; treasurer, Walter Berry, Great Falls.

The domestic science teachers also formed an organization, with the following officers: president, Miss Sater, Helena; secretary, Miss Baldwin, Montana State College, Bozeman. It is the plan of the officers of the two newly formed organizations to hold at least one joint session and several separate round table discussions in connection with the next meeting of the State Educational Association; each section has its own executive committee, and the two committees are to meet at a later date for the purpose of planning an industrial program for the state meeting.

A. S. PETERSON, Secretary,
Bozeman, Mont.

KANSAS STATE TEACHERS ASSOCIATION.

At the meeting of the State Teachers' Association in Topeka, steps were taken to provide a closer organization of the teachers of manual training in Kansas by an appointment of an executive committee for the purpose of developing a plan for such an organization for a spring meeting for further discussions. The committee consists of the newly elected officers of the manual training round table: H. H. Braucher, Emporia; T. M. Wood, Hays; Joseph F. Parks, Wichita; and in addition G. E. Bray, Manhattan; Karl H. Miller, Salina; L. H. Emmett, Lawrence; and A. H. Winter, Topeka. The first work undertaken by the committee is the preparation of a complete list of the names and addresses of manual training teachers in the state. As soon as this directory is completed, it is expected that plans for further organization may be perfected and the details promptly communicated to all those who are interested.

NEW HAMPSHIRE MANUAL TRAINING CLUB.

The second meeting of the New Hampshire Manual Training Club was held in Manchester on November 22, 1913. The forenoon was spent in visiting the extensive plant of the Amoskeag Manufacturing Company. At noon the members met together for lunch and in the afternoon a business meeting was held in the directors' room of the local Y. M. C. A. At this time a report of the executive committee was presented and a constitution and by-laws as recommended were adopted with slight amendments. Details for the next meeting were left in the hands of the executive committee.

A. W. FRENCH, Secretary,
Concord, N. H.

ARIZONA INDUSTRIAL AND ART ASSOCIATION.

A group of teachers met at Phoenix, Ariz., November 6th, and organized for the purpose of mutual benefit and improvement. In order that the Association may not be limited in its scope and influence, but that it may include all departments of vocational training, it was decided that the Association be known as the Arizona Industrial and Art Association.

The following officers were elected: president, Howard Beebe Ross, director of industrial education, Douglas; vice-president, Miss Worthy Johnson, instructor in domestic science and art, Phoenix; secretary-treasurer, Miss Zella Roberts, manager commercial department, Winslow high school.

A committee of five members was appointed by the president to make the necessary arrangements for the next meeting of the Association which will be held in April at Tucson.

ZELLA ROBERTS, Secretary,
Winslow, Ariz.

OKLAHOMA.

At the time of the convention of the District Teachers' Association, held in Clinton, Oklahoma, the first week in December, 1913, the manual training, domestic science, and agricultural education teachers of Oklahoma organized themselves into an Industrial Arts Association. Frank H. McCrea, director of manual training, Western State Normal School, Weatherford, was elected president.

The Association has been divided into three Sections, or Committees, and an effort is to be made to standardize the work in these three departments in this section of the state. An effort is to be made also to induce every school in which these subjects are taught to establish an industrial arts library for reference work along these lines.

NATIONAL EDUCATION ASSOCIATION.

The National Education Association has issued a Bulletin containing the text in full of the "Declaration of Principles," consisting of the report of the committee adopted at the Salt Lake convention in July, 1913. The section of the report entitled "Vocational Education," written by Dr. E. G. Cooley and Commissioner David Snedden, is of special interest to this Department.

VOCATIONAL EDUCATION.

I. The complete aim of education may be variously expressed as preparation for citizenship, self-realization, etc.

II. The complete aim of education may be subdivided into four principal concrete aims, each having a definite place in contemporary education: (a) physical education, which prepares persons for prolonged physical health and bodily usefulness; (b) vocational education, which prepares the individual for the useful and effective performance of the duties related to self-support; (c) civic and moral (or social) education, which trains the individual for effective participation in group life as citizen, patriot, parent, etc.; and (d) cultural education, which fits the individual for effective participation in the esthetic, intellectual, and other cultural activities of civilized life.

III. It is desirable that opportunities for vocational education in schools shall not be restricted only to those entering the professions, but shall be made available for all. Vocational education heretofore has been carried on by other

agencies than schools. These agencies are no longer adequate for the needs of modern society. The school system must, therefore, supplement the other agencies and should include:

1. A system of elementary schools, including kindergartens, which cover the period from infancy and childhood up to the age of fourteen or fifteen. The purpose of the work of the elementary school should be all-round development, including training of the eye and hand, as well as covering the ordinary academic ground in the field of literature, geography, history, and the three R's;
2. A system of secondary schools, both academic and technical, for youth who can devote more time (a) to their education before entering business or industrial life, or (b) to the preparation for the colleges and universities;
3. A system of higher institutions, including those which prepare for the professions, such as law, medicine, engineering, etc.; and
4. A system of vocational continuation schools, part-time and full-time trade or technical schools for youth who wish, or are compelled, to enter vocational life without the broader foundation provided by the secondary schools, the colleges and universities.

It is desirable that the vocational schools suggested under subdivision 4 be added to our present school system, both as a means of preparing the individual for self-support and with a view to supplying that minimum of instruction and training which is indispensable as a preparation for citizenship. No school system can safely permit its pupils to leave at fourteen. At this time character building really begins; the boy or girl is usually subjected to new temptations and new responsibilities. If the instruction and guidance of the school is not continued, much of the result of the previous instruction in the elementary school will be lost. As Frederich Paulsen says:

It will be the mightiest problem of the twentieth century to build upon the elementary school as a general and fundamental form of school a new finishing educational institution, or to give to the elementary school instruction its necessary conclusion in a kind of vocational high school; a school whose problem will be the carrying forward and making fruitful of the general education for vocational activity.

IV. Vocational education is a problem of adolescence and can rarely be carried on with young people under fourteen years of age. The most effective vocational education, therefore, will be that provided in schools for young persons from fourteen years of age and upwards.

V. Vocational education will require for its complete development a great variety of institutions and agencies, according to the occupations for which preparation is being made. Some of these will be all-day schools, some evening schools, some part-time schools, and some seasonal schools; but no school for boys and girls between fourteen and eighteen should be held in the evening or after the completion of a day's work in a vocation.

VI. All vocational education requires that during its progress somewhere and somehow the individual intimately concern himself for a considerable portion of his time with concrete productive work. If possible this should be carried on in commercial establishments on a part-time or other basis.

VII. Vocational education should be made compulsory for young people from fourteen to eighteen years of age who are not in other forms of school. This can be done on the so-called part-time basis, the state requiring that young persons of these ages shall attend a vocational school for at least four hours per week.

VIII. Vocational education in schools for the rank and file of workers can be carried on with public support and under public control.

IX. The support of vocational education should not be provided only by the local community. Owing to the mobility of labor, the benefits of vocational education tend to diffuse themselves; hence it is only equitable that the state as well as the local community should assist in meeting the cost of vocational education.

X. While it is especially important that this new type of school which takes boys or girls on leaving the elementary school and provides a practical vocational education should also consider the needs of the man and the citizen, on the other hand it must be recognized that the vocation should stand as the central point of this system of instruction as the occupations of man stand at the central point of every well-regulated life and exercise a reaction upon all the remaining activities. A good citizen will necessarily be a man or woman who is both able and willing to earn a decent living.

XI. Such vocational schools will keep in mind that the boys and girls in them are endowed with the usual interest in amusements and social activities of various kinds. In the organization of such schools, therefore, play and excursions, entertainments and festivals, libraries and reading-halls, tools, books, and other apparatus must be supplied them. The problem is here as elsewhere with the whole boy and includes his recreation.

XII. "No boy or girl ought to be treated," as Churchill put it, "merely as cheap labor." Up to eighteen years of age every boy and girl who is not in school should be learning a trade or vocation, as well as earning a living. No person should be permitted to employ boys or girls during the formative years without assuming some responsibility for their learning a vocation.

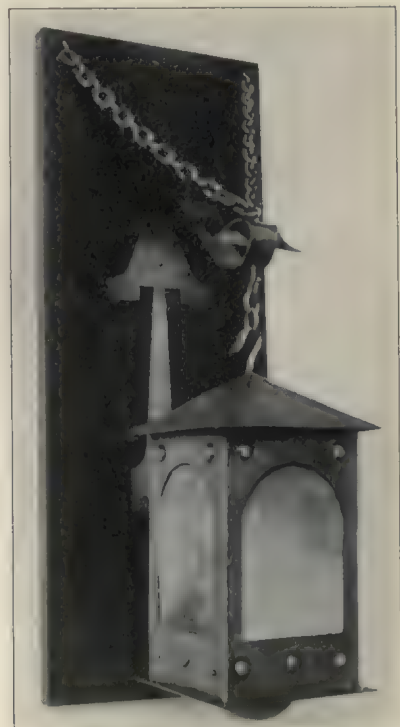
BOOK TROUGH MADE BY PUPIL IN SHAW HIGH SCHOOL, CLEVELAND, OHIO.

SHOP PROBLEMS

GEO. A. SEATON, Editor.

LANTERN.

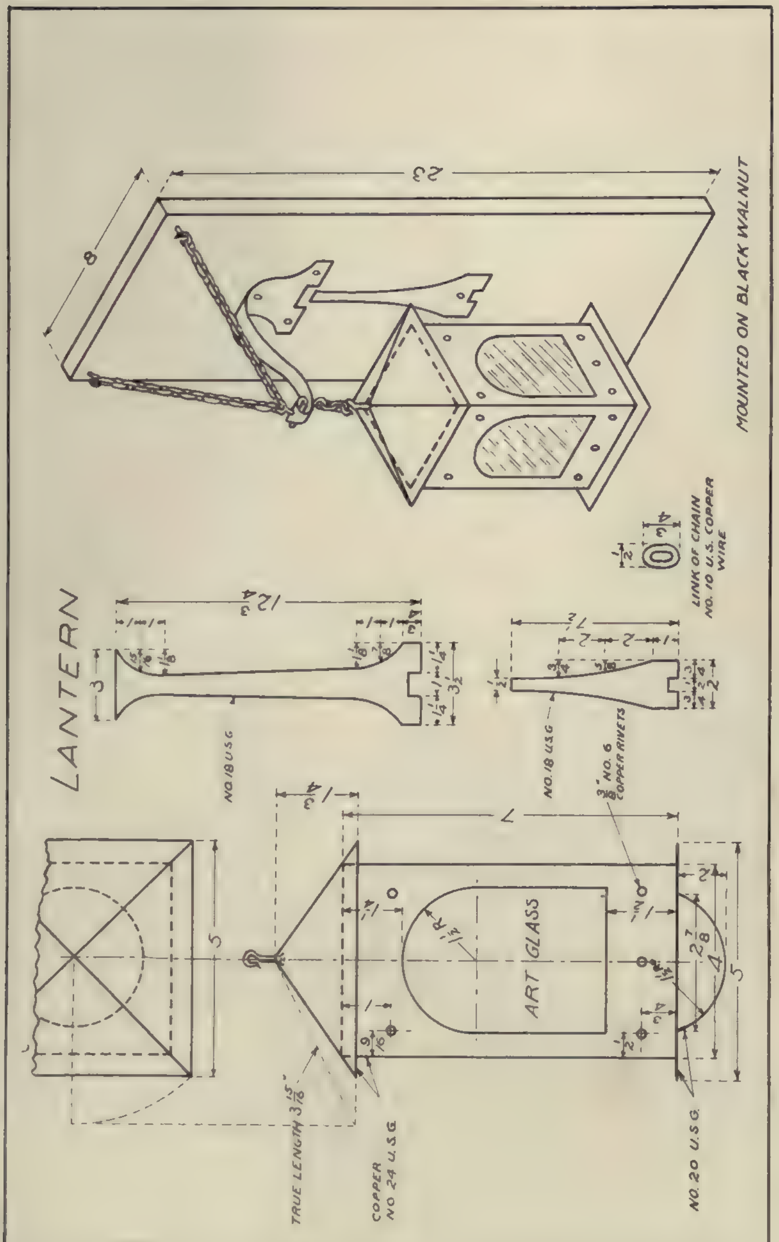
Mr. E. F. Kranquist, of Oklahoma, contributes a photograph of an attractive lantern to be made up of sheet copper and mounted upon a wooden back. The problem is one requiring but a modest equipment of metalworking tools, yet is as pleasing as some made with a much larger outfit.

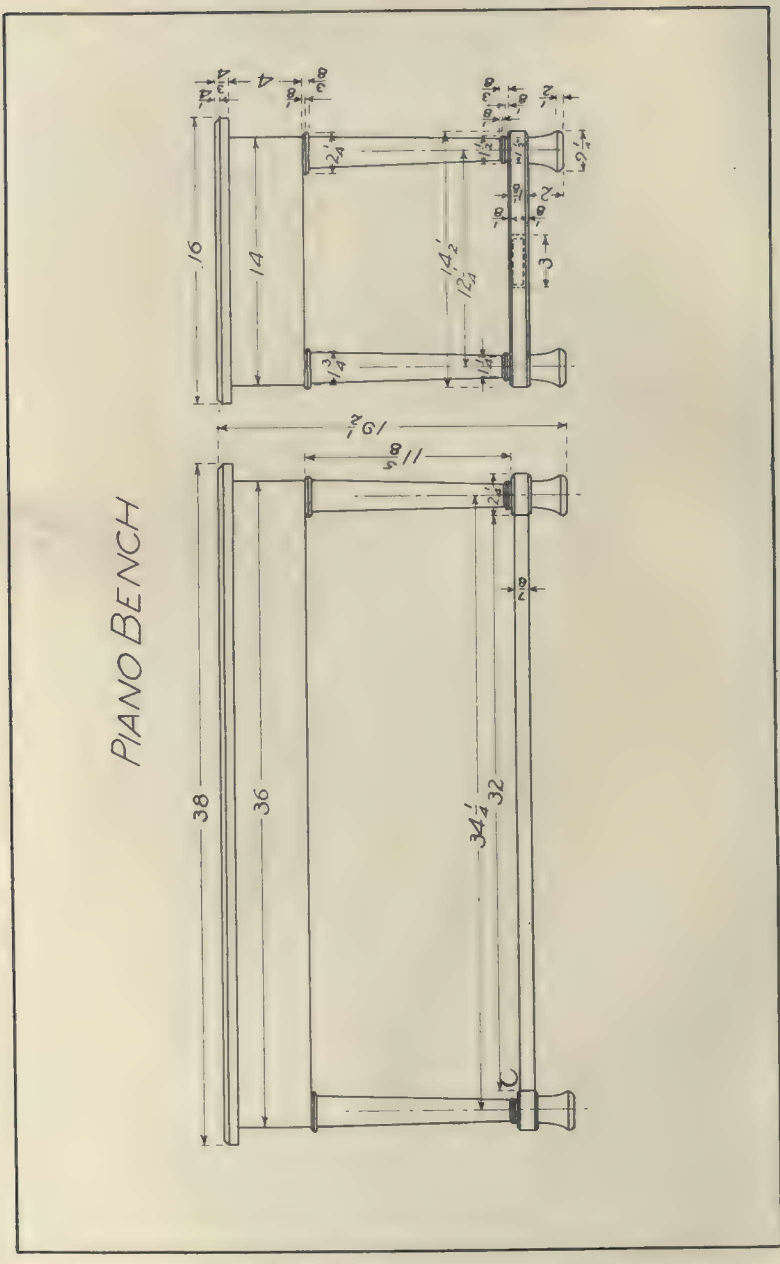


COPPER LANTERN, DESIGNED AND MADE BY E. F. KRANQUIST.

PIANO BENCH.

This is a project which will call for more than the usual amount of skill in its construction, yet will prove worth all the extra effort spent upon it. The base and cap of the central part of the leg are separate pieces glued and doweled into place, with a large dowel running thru the foot. A liberal corner block should be used in the music tray which occupies the space beneath the top. D. K. Hiett, of East Orange, New Jersey, who submits the drawing, feels that there


LANTERN
MOUNTED ON BLACK WALNUT
LINK OF CHAIN NO. 10 U.S. COPPER WIRE
NO. 18 U.S.G
NO. 18 U.S.G
3/8" NO. 6 COPPER RIVETS
ART GLASS
TRUE LENGTH 3 15/16
COPPER NO 24 U.S.G.
NO. 20 U.S.G.


PIANO BENCH
38
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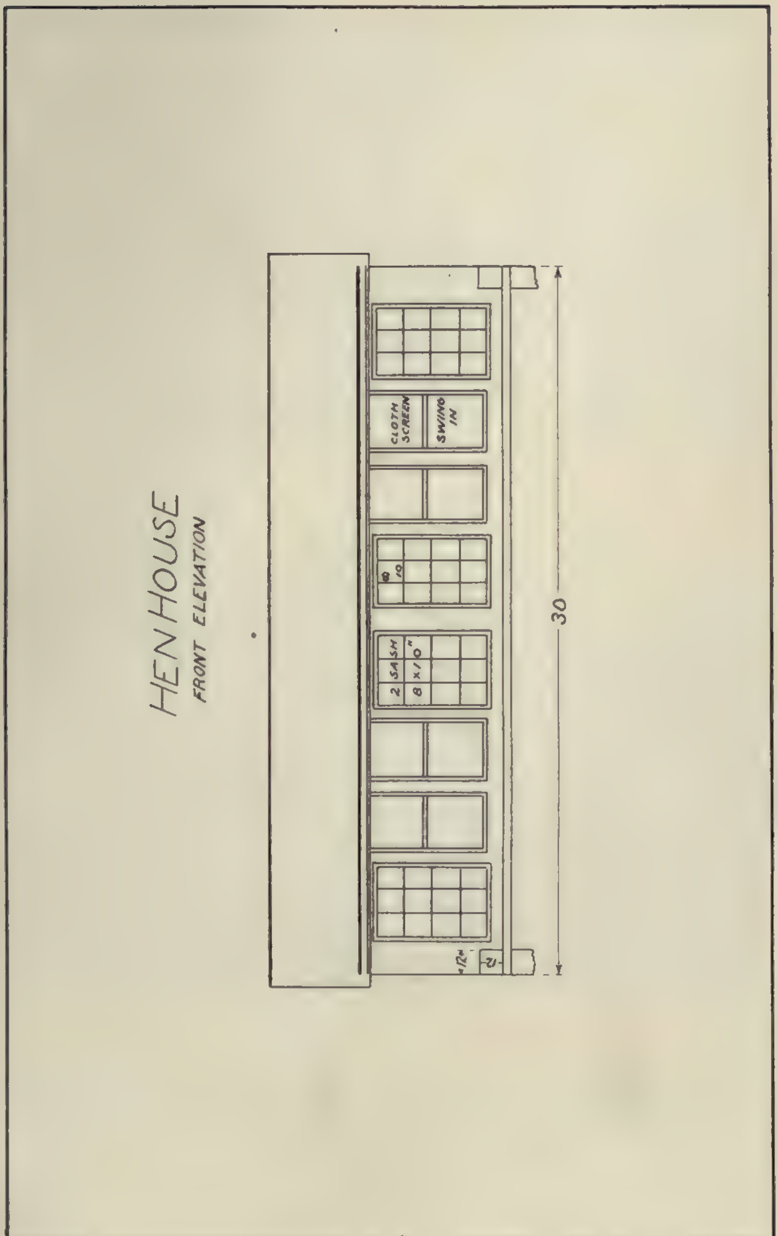
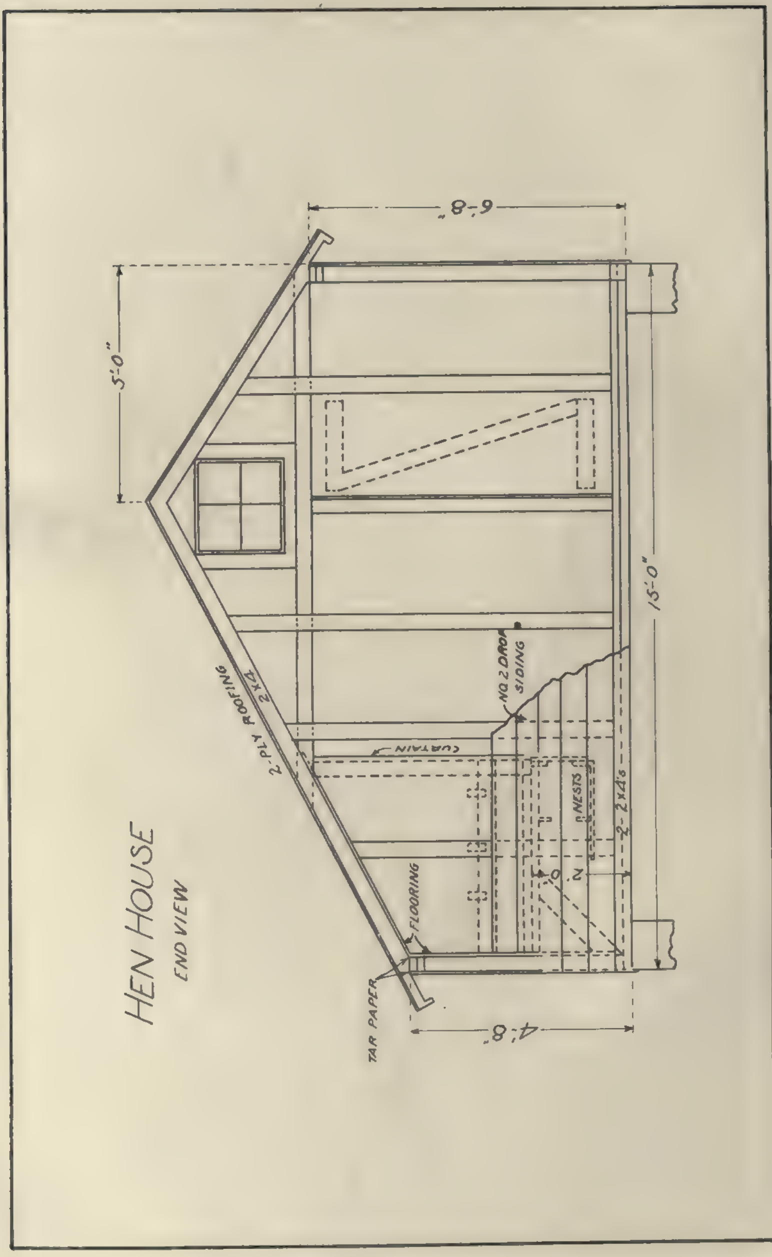

HEN HOUSE
FRONT ELEVATION
CLOTH SCREEN
SWING IN
2 SASH
8 X 10"
30


HEN HOUSE
END VIEW
5'-0"
6'-8"
15'-0"
4'-8"
2-PLY ROOFING
2x4
NO. 2 DROP SIDING
CURTAIN
NESTS
2-2x4's
FLOORING
TAR PAPER

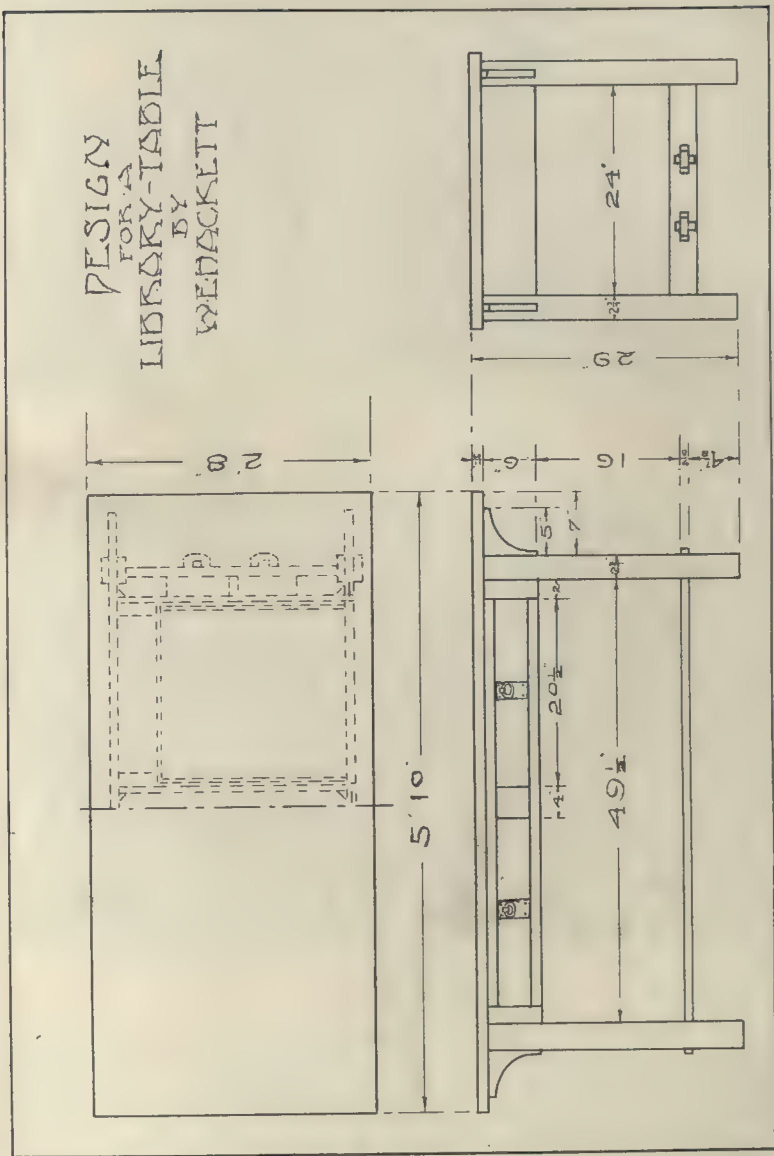
CONSTRUCTION OF THE HEN HOUSE.

HEN HOUSE.

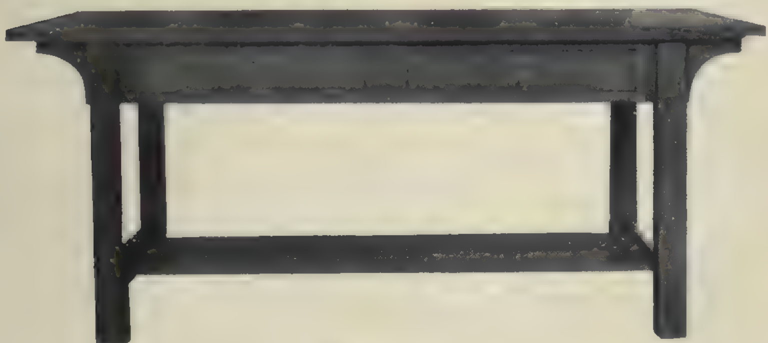
may be some criticism in regard to the making of the legs from so many pieces, but knows of a bench which has been in use for three years and still remains in excellent condition. The piece looks well in mahogany or in some wood ebonized.

HEN HOUSE.

Under the leadership of A. D. Bailey, the boys of Bemidji, Minnesota, seem to be producing some very practical problems along agricultural lines. This


DESIGN
FOR A
LIBRARY-TABLE
BY
W.E.HACKETT
2'8"
5'10"
29"
24"
49½"
20½"
16
6
7
5

month there are drawings and photographs of a hen house constructed upon the school farm. The money for the material was appropriated by the school board and the boys of the eighth grade and the high school undertook the work. The foundations are of cement laid by the boys in the agricultural classes. The studding and rafters were cut in the shop, where also were made the window frames, the nests, and the frames for the cloth screens. The sills and plates are double 2x4's, and the sheathing No. 2 drop siding. On the north side are the nests and roosts. This side of the building has a layer of tar paper on each side of the studding which is sheathed on the inside with matched flooring. Tar paper and flooring were also used to sheath the ends for a distance of four feet, and also the ceiling. This provides a closet 4 by 30 feet for the roosting accommodations. A curtain in front of the roosts completes the four walls of this closet.



LIBRARY TABLE.

The roosts are made easily removable and the dropping board is of dressed and matched fir flooring. The nests are single with a sliding door in front of each nest. A partition in the middle makes possible the separation of the hens and pullets.

The roof is of rough boards covered with certaineed roofing. Cross ties at regular intervals are used to strengthen the roof and on these rough boards are laid about 1 inch apart. On top of these boards were placed two loads of straw to help keep the house dry. This straw was put in place thru the small windows at the ends.

LIBRARY TABLE.

An unusually large library table is shown by photograph and working drawing, which come from W. E. Hackett, of the Boys High School, Reading, Pennsylvania. Aside from its size no unusual difficulties should be encountered in its construction.

CURRENT ITEMS

A PROBLEM IN MECHANICS.

The accompanying illustration needs no long explanation to convince any person acquainted with boy nature that the construction of such problems is full of interest, or to show to the manual training instructor the principles involved, or the educational value of such work. A few words, however, showing how the problem was approached may give a setting to the picture.

The subject of "Industrial Problems" versus "The Useful Model" has been given a full measure of attention during the past few years, and it is not the intention here to add to this discussion. To employ an expression recently used by Mr. Pickwick, "we are still doing some old-fashioned manual training" in Trenton, while at the same time we are trying to keep our minds alert to grasp the rich opportunities that an industrial community affords us in leading our boys to grasp the significance of the activities that surround their daily life.

A class of boys in the sixth grade of the Joseph Wood School was discussing with their instructor, Frances E. Mack, the various forms of building construction then in progress in the city that had come to their attention. An addition to the State House was being built with cut stone as the principal material. The problem of raising these stones and putting them in place was the particular feature of the discussion that brought out the use and value of the derrick. Other places where the derrick or crane were in use were quickly recalled and the particular objects hoisted were noted; such as in the canal basin, where sand, brick, coal or stones were unloaded from boats; at the freight yard, where heavy iron beams or pipe were taken from car to wagon, etc.

The suggestion that models of derricks be made in the shop soon followed. The class was dismissed with instruction to study a derrick only, and to return to the shop the next week with as much information about derricks as they could get, including sketches and names of the various parts. Additional suggestions followed later which led to a study of the relative length of mast and boom, location of pulleys, reeving of tackle, position of guy ropes, etc.

Every manual training instructor knows what followed—enthusiasm ran to fever pitch. But altho the discussion to this point had been general and, with the entire class, it is interesting to note that not all the boys decided to undertake the project. Those who did were put upon their own resources to supply such material as was not available in the shop at that time. Wire for guys, strips of leather from an old fly netting for reeving, pulley wheels from old pulleys and spools for drums poured in from various sources. Wire nails bent to form crank and axle, spools mounted in frames for drums, and the wheels set in pulley blocks of their own construction attest the ingenuity and inventive genius of every worker. No two derricks were alike.

Altho some of the pupils were engaged in the routine work of the class or at work on other projects of their own selection, every member of the class caught the spirit of the project and reaped a certain share of benefit. The corner at the annual exhibit where the derricks were displayed was never deserted.

MADE BY SIXTH GRADE BOYS, JOSEPH WOOD SCHOOL, TRENTON, NEW JERSEY, FRANCES E. MACK, INSTRUCTOR.

Proof of the success of this project and of many similar ones is not needed beyond the mere statement. However, this is not because they form a part of the "course" or because they are "inspired" by the supervisor, but solely because of the ingenuity, enthusiasm, ambition and good judgment of the instructor who takes advantage of the right time and the rich opportunities that are ever present to lead his pupils into a broader and deeper observation and investigation of the life of the community in which they live and of which they form a part.

W. R. WARD, Supervisor.

HIGH SCHOOL DEDICATORY SESSION.

The meeting of the Jersey City Board of Education issued invitations to the public to attend a dedicatory session of the William L. Dickinson High School on Friday, December 5th, 1913. No special plans were made for exhibit work other than to print a circular of information for distribution. The regular day school program was changed from the regular hours and run from 4:30 p. m. to 10 p. m. At least 16,000 people visited the school between these hours, and there were many expressions of satisfaction in the opportunity to see the school at work. It is the opinion of the Board of Education that the session made a decided impression upon the visitors who came.

The school is named after William L. Dickinson, who was city superintendent of schools in Jersey City from 1870 to 1883. Originally the high school was only half the size of the present building. The total number of pupils enrolled on the opening day was: boys, 279; girls, 655; total, 934. The faculty on the opening day consisted of 7 men and 19 women teachers. In 1910 work was begun on the northern half of the building and in November, 1911, it was open to classes.

The school, as it is equipped today, provides for instruction for both boys and girls in three distinct departments: Academic, Commercial and Industrial.

In the basement south, are found the gymnasium, lunch rooms, and locker rooms; in the basement north, the foundry, forge-shop, elementary and advanced machine-shops, woodworking room, mill-room, and photographic dark room. A mezzanine floor contains lockers for shop and night school pupils. On the first floor south are found the vocational commercial classes; and on the first floor north, the print shop, pattern-making shop, cabinet-making shop, and electrical construction rooms.

The second floor north and south contains rooms devoted to languages, mathematics, and mechanical drawing. On this floor is located the auditorium, with a capacity of 2,000 seats, the library, reading room, and reference room.

The third floor north and south, except for a few classes in German, is devoted to science work and science laboratories. The fourth floor south contains two drawing rooms.

The fourth floor north is devoted to domestic science and domestic art, and contains the applied design, dressmaking, cooking, sewing, and millinery rooms.

The power-house which supplies the building with heat, light, and power, is located in the hollow square in the center of the building.

The enrolment of the school for this term is 1,118 boys and 1,436 girls, a total of 2,554 pupils. The faculty at the present time consists of 49 men and 54 women, a total of 103 teachers. The building, grounds, and equipment, represent an outlay of about $1,400,000.

SHORT COURSES IN MANUAL TRAINING.

Short courses for farmers' boys are becoming a very important feature among the schools of Minnesota. The high school at Hinckley has had a short course for four years, with an increasing attendance. Not only the boys but the farmers themselves, in many cases, are planning to attend this year. The course of study includes agriculture, manual training, business practice, and English.

The course in manual training is arranged to meet needs expressed by the farmers, and consists of woodwork, ironwork, and cement work. The following outlines of the work in these courses by weeks will prove, we believe, a definite help to those of our readers who are undertaking the short course work for the first time:

FIRST YEAR.

Wood Work.

1st week. Name and care of tools, squaring of block and making of joints.

2nd. Sharpening of tools. Filing and setting of saws.

3rd Bread cutting board, Milk stool, Nail box, Bushel crate. — one or more

4th Mitre box, Sleeve board, Fork rack, Saw buck. — one or more

5th Ironing board, Chicken coop, Corn rack, Step ladder. — one or more

6th Barn frame.

7th Seed corn tester, Eveners, Farm gate. — one or more

8th Study of forge. Making of fire and use of tools.

9th *Drawing and Bending.*
Open eye hook.
Gate hook.
Staple.

Iron Work.

10th *Welding*
Solid eye hook.
Single tree hook.
Log chain hook.

11th *Welding*
Bolt head.
Clevis.
Chain link and chain.

12th *Tool Making and Tempering.*
Cold chisel.
Cape chisel.
Screw driver.
Punch.

13th, 14th and 15th. These three weeks will be given to work where there is a connection between iron and woodwork, articles such as single trees, wagon boxes, harrow frame, to be made.

16th General review.

SECOND YEAR.

1st Work on joints.

2nd Step ladder. / Ironing board. / Foot stool. — one or more

3rd Wagon jack. / Corn marker. / Corn rack. / Book rack. — one or more

4th Cow stanchion. / Hog rack. / Wheel barrow. — one or more

5th Tool chest. / Clothes chest. / Work bench. — one or more

6th Barn frame.

7th Rope tieing and splicing.

8th *Welding.*
Flat weld.
T weld, corner weld.

9th Welding and bending tongs.

10th and 11th Iron and wood work combined.

12th *Study of Cement.*
Kinds, manufacture and reinforcement.

13th Making of forms.
Making of fence posts.

14th Making of cement blocks.
Making of hog trough.

15th Making of water troughs.
Making of machine base.

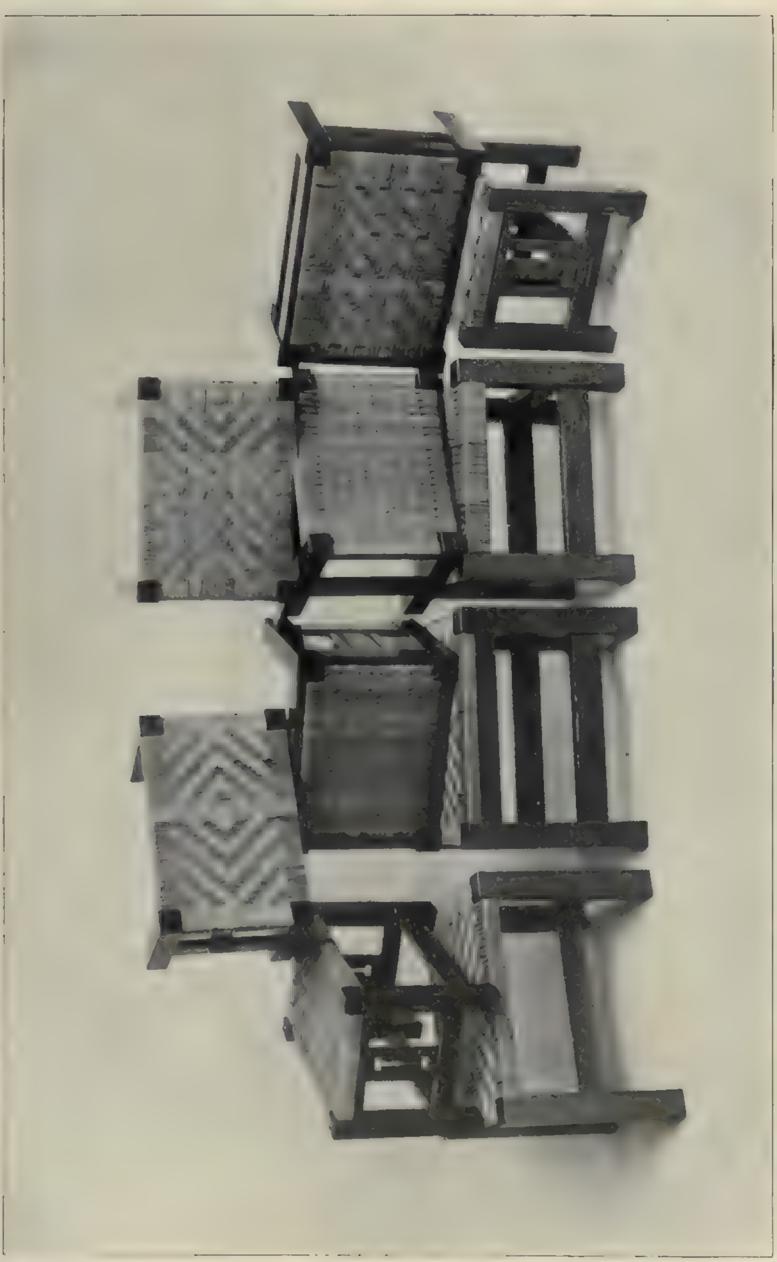
16th General review.

R. W. La Du, the director of manual training reports that many of the boys who have taken this short course, have either installed a forge at home, themselves, or have persuaded their fathers to do so, and are now doing the repairing and making of useful articles which before were taken to the blacksmith in the nearest town. This is a great saving in both time and money.

As will be seen by the outline the course covers two years of sixteen weeks each, at the close of which a diploma is given. Last year all but two of the first year boys returned to take up the second year's work.

Saturday morning classes in benchwork, wood-turning, book-binding, metal-work, and jewelry are offered during the winter at the Sloyd Training School, Boston, of which Gustaf Larsson is principal. The purpose of the Saturday classes is, (1) to give graduates of the school opportunity for special work and such work as may be demanded in their respective schools; (2) to offer to teachers who contemplate specializing in manual training an opportunity to ascertain their fitness for the work; and (3) to give to supervisors and teachers engaged in regular school work an opportunity to gain an insight into the merits of Sloyd methods and to compare these with the so-called industrial methods. Short talks will be given on the respective merits of industrial and educational methods of manual training.

We present on pages 251 and 252 two illustrations showing work done in the Sloyd Training School.



STOOLS DESIGNED AND MADE BY STUDENTS OF THE SLOYD TRAINING SCHOOL, BOSTON, MASS.

SOME FINE EXAMPLES OF WOOD-TURNING WORK DONE AT SLOYD TRAINING SCHOOL
BOSTON, MASS.

A NEW DEPARTMENT IN THE TRENTON SCHOOL OF INDUSTRIAL ARTS.

A new department, known as the mechanics course, was opened at the Trenton School of Industrial Arts in September. It is a day department with a three-year course, for boys who have finished the eighth grade and who wish to prepare directly for the industries or for higher technical schools.

The course of study includes, the first year, mechanical drawing and mathemathics, each ten hours a week, and industrial history, drawing, and modeling, each five hours a week; the second year, mechanical drawing and woodworking, each ten hours a week, mathematics five hours, English three hours, and physics two hours a week; the third year, physics, metalworking, and applied mathematics, each ten hours a week.

It will be noted that no shop work is given the first year. The director of the school, Frank Forrest Frederick, believes that better results in shop work will be secured if the first year is spent in obtaining a good foundational knowledge of the mechanical drawing and mathematics which underlie the work of the shop.

Individual instruction is the method of teaching employed in the new department. As far as possible the boys are treated as apprentices in a commercial establishment. It is hoped that this will result in more rapid advancement and greater efficiency on the part of graduate students either in advanced schools or shops.

NEW FEATURES IN EVANSTON.

In Evanston, Illinois, the manual arts department was reorganized, this year, and was given headquarters in the Haven school which is devoted entirely to manual arts work for sixth, seventh and eighth grade pupils. In this school there are the three grades with required and elective courses, and an ungraded room, where still more individual instruction is possible.

The required work for the sixth, seventh, and eighth grades, consists of manual training and drawing for boys, and domestic science and art for girls. The elective courses are prevocational in character, designed to give the pupils a glimpse of various industries as a means of helping them to determine what vocation to select. That the opportunity to secure this instruction in handwork is appreciated is shown by the enrolment which is for the sixth grade, girls, 133; boys, 131; for the seventh grade, girls, 110; boys, 119; for the eighth grade, girls, 120; boys, 90.

In the ungraded room, which enrols 34 boys and 15 girls, one-half the time is devoted to industrial work and the other half to academic work. None of these pupils expect to enter the high school, but it is hoped that the intensive study of the prevocational work will be of sufficient interest to hold them thru a completion of a course equivalent to the eighth grade. One of the newer trade classes this year is printing. Four boys are devoting every afternoon to this subject, with the exception of one and one-half hours for drawing. An employment bureau is maintained in connection with the ungraded room.

Athletics and other features of the usual elementary school are found at the Haven school, the difference between this and the other schools being in the nature of emphasis and time allowance for handwork. Friday afternoon talks have been arranged for pupils of the ungraded room, which will assist in the work of broadening the general intelligence of these pupils.

The privileges of the school have recently been extended to pupils of the fifth grades in the city system.

T. L. Adams is director of the manual arts department in Evanston, and is assisted at the Haven school by one man and five women teachers.

A new high school of the cosmopolitan type is being erected in West Duluth, Minnesota. Departments of manual training, domestic economy, and commerce will be given a generous allowance of space in the new school.

The rooms for manual training are located on the main floor and in the basement. On the first floor are the pattern-making room, 25x62 feet; the lathe room, 37x25 feet; the wood stock-room, 25x46 feet; bench room, 25x61 feet; and store, supply, and finishing rooms. In the basement are found the machine shop, 25x98 feet; the foundry, 24x42 feet; the forge room, 35x42 feet; and the engine room, stock and tool rooms. The mechanical drawing rooms, two in number, are on the third floor, where a blue-printing room is in connection.

A main floor auditorium, a library, a gymnasium, extensive laboratories, program clocks, and an inter-telephone system are other features of this modern school. The school is named in honor of the superintendent of the Duluth schools, Robert F. Denfield.

Carlisle, Pennsylvania, will have ready by September, 1914, a large new high school of the cosmopolitan type. A large number of the rooms in the new building will be devoted to the uses of the departments of manual arts and domestic economy. These rooms will include a mechanical drawing room, a freehand drawing room, a carpenter shop, mill room, concrete and erecting room, forge shop, machine shop, sheet metal shop, laundry, kitchen, sewing room, and model dining-room. The commercial branches will also have specially equipped rooms.

The new high school comes as the fulfillment of a plan made by Charles L. Lamberton before his death. Mr. Lamberton was a New York lawyer and capitalist who remembered his birthplace and boyhood home in the bequest of an educational fund, to be invested for a period of ten years, and then to be used in establishing and maintaining a school for the education of boys and girls of the Carlisle public schools in the "industrial, mechanic, technical and scientific arts."

The new high school will be constructed at a cost of a little less than $90,000. It will present an unusual opportunity to the young people of a city of less than twenty thousand people.

The manual training department of the South Omaha schools is being expanded and improved to a considerable extent this year. In the high school a lathe shop has been equipped with twelve underdriven wood lathes and all

tools necessary for pattern-making. In the woodworking shop a 24-inch surfacer, a combination saw table, a 36-inch band saw, and a universal grinder have been added. A room has also been equipped for mechanical drawing.

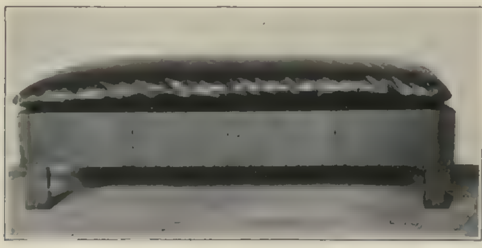
Ninety minutes each day are now given to the work of this department in the high school, the course including joinery, cabinet-making, carpentry, wood-turning, and pattern-making.

The work in the grades has been improved by the addition of three ward centers for woodworking, making eight in all, and by the addition of an instructor in charge of the grade woodworking. Two periods a week are given to this work. Basketry, clay modeling, and wood carving, are given in the fifth and sixth grades under the instruction of two women teachers especially trained in this work.

Another new feature in the South Omaha schools is the equipment of rooms for domestic science, domestic art and household management. One instructor has charge of the high school classes in these subjects and two direct the work in the grades.

R. O. Bagby is supervisor of the manual arts department in South Omaha.

The pupils in the manual training department of the Rahway, New Jersey, schools repaired over four hundred old toys in December, and put them in condition to be distributed at Christmas by the Union Aid Society. The shop work in Rahway begins in the sixth grade and continues thru the high schools. The eighth grade boys are progressing rapidly because of the larger time allowance given them this year. They now have four hours a week. The high school boys are constructing furniture of various sizes and uses, the work being conducted as far as possible from the commercial point of view, with time sheets, record cards, etc. The machine shop in the high school is equipped with three lathes, a table saw, band saw, a tool grinder and jointer, all operated by electric motors. Four years of mechanical drawing are now provided in the high school, leading to work in architectural drawing. Arthur L. Perry is supervisor in Rahway.



MADE IN HIGH SCHOOL, KANSAS CITY, KANSAS,
D. C. GILBERT, SUPERVISOR.

FOREIGN NOTES

H. Williams Smith.

The Scout Movement bids fair to create a corner in laurels. From quarters, even the most unlikely, approbation comes. We read that there are 200,000 scouts in this country, but twice as many in the States. Spain gives an annual Government grant of £5,000 to the boy scout movement in that country. In almost every school in Russia there is a boy scout corps. Bishops bless it and patriots caress it. The Bishop of Winchester said, a bishop who was not interested in the Scout movement must be something either of a knave or a fool. He found Sir Robert Baden Powell's manual on scouting full of interest, and that it taught many things he as a bishop was trying to teach in another way. More than once when speaking to lads at confirmation he had used bits of the manual to help him say what he felt he ought to say. In brief, the manual anchored the bishop to earth, and kept him from soaring too high cloudwards. When you bear in mind that the most insistent note in the scout manual is that of manual training, you will understand just why I give space in my notes to the scout movement. Further, I do not depreciate it for its military touches. There are good things to copy in army discipline. The Salvation army found out that long ago. I do not despise the drums and fifes, and the other noises that exuberant scouts make. Skeptics and doubters should accompany me on my Saturday afternoon walk on Hampstead Heath, and then, even if they "came to scoff," they would remain to approve.

The Daily Mirror says "If Lieutenant-General Sir. R. Baden Powell were Minister of Education a boy's life at school would be a perpetual paradise, and holidays would simply bore him." There is the usual touch of journalistic exaggeration about this, but there is truth in it. Sir Robert says:—"It is not our object to force boys to learn anything. The scout movement gives them the ambition to learn. Employers of labor nowadays give preference to boys with scout badges. No amount of forcing or cramming knowledge into boys' heads will give them any self-reliance or character for after-life."

The London Teacher says: The future alone can decide as to the permanency of this great international organization. Teachers would be woefully lacking in common sense, however, if they failed to recognize the enormous vitality of a movement which has grown up completely outside the schools." Those last few words are remarkable, coming from a teachers' paper. Teachers are, as a body, none too generous in recognizing educational efforts which they have not originated.

The Boy Scout does not merely play at soldiers or at backwoods craft *a la* Fenimore Cooper, but he learns to become a handy man, able to cope with the emergencies of life, and he is essentially an open-air boy. One troop made a manual fire-engine, which would throw water over a two-story cottage. At a recent exhibition dynamos, aeroplanes, bridges, derricks and so forth, all made by scouts, were on view. In one section of the exhibition signallers gave a

display with Morse flags and lamps and wireless apparatus, while in another young poultry farmers showed how deftly they could pluck and truss fowls for market. The boy scout is expected to do a bewildering variety of things. Talk about our Jack Tars as handy men! The scout is rapidly becoming a kind of super-handy lad. And the manual training idea at its best provides the whole scout curriculum.

Scouting, as an instrument of learning, has been applied in the most serious way by the head master of Harrow County school. This school must not be confused with the famous public school. It serves a district of Middlers, while Harrow School is one of the great English public schools. It would be all to the good if the big school went on similar lines to the smaller one. This Middlesex head master has transformed a secondary school into something undreamed of and almost inconceivable ten years ago. Lessons are adjusted to lead up to the winning of scout badges, and learning has thus taken on a new interest. The boy who once cordially detested French verbs is keen as mustard to get his interpreter's badge. What is more, scouting has put into each boy a spirit of enquiry, and now "he wants to know, you know." The experiment has killed loafing and idleness. The last bit of communal work was a pavilion for the school playing field. Morally, too, the experiment has been a success, and the boys have had awakened in them a desire for social service—"civics," it is called—which should be of great service to the community and themselves in after life. A most significant tribute to the success at Harrow lies in the fact that Mr. J. L. Paton, high master of Manchester Grammar School, heard of Mr. Young's doings, paid a visit to Harrow, and returned to do likewise. And when Mr. Paton says that anything is so, it's *so*.

Miss Margaret McMillan writes with enthusiasm in *The Daily News* on the marvelous dexterity of the Staffordshire potter. She says, "In an age that is beginning to be interested in touch-training how should one fail to note this triumph of triumphs?" She believes in pottery as a branch of manual training, as follows: "No school, we know, can teach what these hands have learned. * * * * still I wish that opportunities for such touch-training could be given in all schools. * * * * it would be an invaluable factor in the whole process of learning not one, but almost any subject." You will observe that a new term is given to our work by Miss McMillan—"touch-training." By the way school handwork exponents strive to give the subject new names, you would think that a "Nobel prize," at least, depended on it.

The French Government has inaugurated a system of education in its tropical dependencies which includes the teaching of simple domestic science to the little colored people.

Notwithstanding considerable opposition, cobbling as a school craft is making headway in London schools. Formal experiments are in progress. The boys selected are chosen because of ability shown in the woodwork centre, and no boy is to have more than six months' instruction. An official report thus:—"Cobbling

is a form of handwork. There is but little scope for initiative and originality of treatment is a demerit rather than a virtue. The cobbling class plays a part in the corporate life of a school containing a large number of poor children. It might also be urged that this work may not unreasonably be compared with the work done in cookery and needlework by the girls."

After some very deliberate and cautious experiment the London County Council has decided to allow the introduction of handwork into a further limited number of their school departments during the ensuing educational year, 1914-15. This work is at present being taken in some 400 departments, and it is designed to link up the handwork of the infants' schools to the manual training of the senior classes. Head teachers who have not yet been authorized to take the subjects, and who are desirous of doing so, have to make application to the Education Officer before a certain fixed date; and are required to give a brief note as to the syllabus of work which would be followed, and the names of any members of the staff who are especially qualified to give instruction in handwork. It is perfectly characteristic of English procedure that, for the present, at any rate, only those teachers "who are desirous of doing so" need take up handwork for their pupils; but there are indications that an era of compulsion is not many years away. It is certainly best, while matters are in a tentative stage, and while many experiments are not yet justified of themselves, that only those teachers who have thought out the theory and acquainted themselves with the practice of school handwork should have to do with it.

Twenty courses in handwork for the lower standards were authorized by the London County Council for the 1913-14 session. This was an increase of five courses as compared with last year. About 1,200 teachers have been admitted to the courses, but 400 have had to be refused owing to the lack of accommodation. Teachers who unsuccessfully applied for courses this session will probably receive priority of consideration next year.

In certain Derbyshire elementary schools, lessons are being given to boys on "Helpfulness in the Home," and they are learning, to their astonishment, that it is possible for a boy to sew on a button. When they have recovered from the shock of this discovery (says *The Daily News*) they are shown that it is not out of the question for a boy to darn a hole in a stocking. For this revolution Miss Wilena Hitching, organizer of home management for Derbyshire, is responsible. The Derby lads are now going to cultivate the amenities of home life by practicing all kinds of chores in school. You remember, no doubt, that Squeers led the way in this sort of thing. "W-i-n, win, d-e-r, der, winder. When the boy knows this out of book, he goes and cleans it." Dickens missed his aim for once, here. He was such a great educator himself, that he could not help making Squeers a better pedagogue than he intended him to be.

REVIEWS

Agricultural Drafting. By Charles B. Howe. John Wiley & Sons, New York, 1913, 8x10¾ in. oblong; 46 pages of text, 45 figures, 22 plates; price $1.25 net; 40 problem sheets 2 cents each, extra.

None of the recent textbooks intended for students in agriculture has been so interesting to us as this book in drafting. It is the first book of its type in the field. It is intended for the use of students in agricultural high schools or town high schools or agricultural colleges—in fact, for any school or for any person who wants to know practical drafting as it relates to farm life. Tho the book opens up a new field and is therefore a pioneer, it does not possess the usual defects of a pioneer book. It is comprehensive in scope and correct in pedagogic method.

After a well illustrated chapter on the use of instruments and tools, which also includes two excellent plates on conventional lines, dimensions, letters and figures, and a chapter on general instructions about the lay-out of the sheet of drawing and how to proceed in certain fundamentals, it gives attention to the different kinds of drawings, with special emphasis on working drawings. Then follow the last two chapters which have special reference to farm life and therefore give distinctive character to the book. The first of these chapters is on building construction. It treats of the farm house, barn framing and details of construction. Considerable attention is given work in concrete. For example, it shows the framework for making a trough, steps, cellar wall, cesspool, a cistern filter and several types of silos. Proper arrangements of plumbing are also shown. The last chapter is devoted to farm maps from the survey of an ordinary plot of ground to a topographical map employing in its make-up many of the standard conventional methods of representation.

But from the teaching standpoint the finest part of the author's work is not in the text or the plates, but in the sheets of problems which accompany the book. These are given unsolved, or rather, the sheets give all the data for the problems and the book gives further information concerning the drawing process. Among the elementary problems are a portable hen's nest, bin, bee-hive, step ladder, saw horse, gate, water-trough, chicken coop, work-bench, table and hopper. To such as these are added problems in machine parts, and then such construction problems as a hot-bed, concrete cistern, root cellar, septic tank, smoke house, concrete milk vat, dairy house, horse stable, cow barn, complete farm barn, silo and farm house. The plates are clear and the draftsmanship good.—C. A. B.

Lehrgang für die Hobelbankarbeit. The woodworking course at the school for the training of teachers of boy's handwork in Leipsic of which Dr. Alwin Pabst is the director. Published by Frankenstein and Wagner, Leipsic, 7¾x10½ in.; 76 pages, 17 plates of working drawings.

Teachers who were familiar with the Leipsic course of ten years or more ago may be surprised to see how many changes have taken place since that time —how much it has been affected by the modern art movement in Germany and

the effort to unite art and construction in the manual training shop. Yet in bringing about these changes nothing of the old-time thoroness seems to have been lost. Good construction is still the first consideration in designing the models, but that is not the end. Sound construction plus the most pleasing beauty elements is the goal. The volume itself is a fine piece of bookmaking, and an illustration of German thoroness.—C. A. B.

Radford's Mechanical Drawing. 6x9, 272 pages, 165 illustrations and a supplement showing perspective views and floor plans of 41 brick, cement, and frame residences.

Radford's Architectural Drawing. 6x9, 304 pages, 147 illustrations and a supplement similar to Radford's Mechanical Drawing. These two are companion books. Price $3.00 for the two.

Radford's Practical Barn Plans. 8x11, 160 pages. Price postpaid $1.00.

Radford's Details of Building Construction. 9x12, 200 pages, price $1.50.

Model Set of Architect's Plans. A complete set of Architect's plans, 13x22, of a modern 9 room house printed on durable tracing paper, so that they can be blue printed.

All five of the above books are published by The Radford Architectural Co., Chicago. The first begins with the drawing tools, describes their use, illustrates and explains the principles of mechanical drawing, gives a few exercises and practical problems, all in much the same way as has been done by previous text-books. The second book, "Architectural Drawing," is a continuation of the first. The two books describe very fully the work of an architectural draftsman, are bountifully illustrated, and clearly and concisely written.

The contents of the third book fully justifies its title. It would be difficult to conceive of a greater variety of farm building plans and descriptions being printed in the same space.

The fourth is full of complete details of everything pertaining to building construction, also many details of easily constructed furniture and household conveniences. These are thoroly modern.

The worst feature of these books is their first impressions made by the colors of their covers and the feel of the rough book paper on which they are printed. On the other hand they are full of practical details and show that they were written by men of broad experience in construction work. They should be of value to everyone who has to do with building construction.

None of these books are well arranged to be followed as text books. Yet, there is abundant reference material here for any course in architectural drafting. The books are so low in price for the subject matter contained that they could be used as a substitute for well-planned text-books and adapted to nearly any condition by a careful organization of reference.—F. H. EVANS.

The Hiawatha Painting Book. Published by The Prang Company, New York, 7x10 in., 32 pages.

This unique book consists of eight sheets of drawing paper folded and bound into book form. On one side of most of the pages is an outline drawing representing some scene in the life of Hiawatha, below which is an appropriate verse

from the poem. Children are expected to color the pictures appropriately, also the borders surrounding them. The pages are perforated so that they may easily be torn off as soon as completed.

This little book will stimulate and give point to color study in many an elementary school.

Ideals and Democracy. By Arthur H. Chamberlain, Editor of Sierra Educational News. Rand McNally & Co., Chicago, 1913. 4¾x7¼ in.; 173 pages.

This interesting volume by the author of "Standards in Education," brings into one mosiac picture the various shades of modern progressive thought on education. Here one finds discussed personality, duties of the home, industrialism, libraries, education as an investment, greater efficiency, vocational adjustment and attainable ideals. All these and several other topics are presented in the light of modern educational theory and practice and in full appreciation of the insistent demand that education be more practical.

The author sees no such dangers in this demand for vocational education as are sometimes voiced by writers on modern tendencies in education. He says, in his chapter on "Vocational Adjustment," "We have come to know that what is vocational in the proper meaning of the term is truly cultured, and that there is no divorce between culture and accomplishment." The danger that he would recognize, if there were occasion to do so, would be in making vocational training a dominant factor in the work of the elementary school. In this connection he introduces a distinction between education and adjustment which helps ones thinking: "In considering the dominant interests of the child let the distinction be drawn as between vocational education and vocational adjustment. Vocational education is specific education, and this should not be emphasized at too early an age. Vocational adjustment implies a study of tendencies and capacities, a seeking after dominant interests and the developing of these possibilties and interests. In a modern school, working under a national course of study, all pupils may be given a thoro grounding in fundamentals. * * * And these fundamentals afford one of the channels thru which the work of vocational adjustment is to be carried on."

The book is written in a graceful style and is lightened up by many bits of personal observation and experience. In fact it is a readable book on modern tendencies and ideals in education.—C. A. B.

RECEIVED.

Proceedings of the Wisconsin School Arts and Home Economics Association 1912-1913. Frank M. Karnes, Secretary, Kenosha, Wis. This contains lists of officers and members, a history of the Association, reports of committees and several papers presented at the meeting held last April.

The Curriculum of the Horace Mann Elementary School. The May number of the Teachers College Record, Teachers College, Columbia University, New York City. Price 30 cents. Outlines of work in the industrial, household and fine arts, as well as English, nature-study and physical education. Illustrated with half-tones of work done by pupils.

Drafting Data. For students and draftsmen, compiled by Anson W. Smith, Pratt Institute, Brooklyn, N. Y. For sale by the author at $2.50 a dozen. A little book, 3x5½ in. oblong contains 64 pages. It consist of tables of data concerning standard sizes of a great variety of machine parts; for example, handwheels, keyways, keys, nuts, thumb nuts, wrenches, screws, drills, pipe fittings, etc.

Los Angeles State Normal School. Souvenir program of laying of corner stone of their new buildings. Contains architect's plans and elevations of the buildings.

The Elementary Industrial School of Cleveland, Ohio. By W. N. Hailman. Bulletin No. 39, 1913, of the U. S. Bureau of Education.

The Reorganization of Secondary Education. Preliminary statements by Chairmen of committees of the commission of the National Education Association. Bulletin No. 41, 1913, issued by the U. S. Bureau of Education. The manual arts report is by Professor Leavitt of the University of Chicago.

An Experimental Rural School at Winthrop College, Rock Hill, S. C. By Mrs. Hetty S. Browne. Bulletin No. 42, 1913, of the U. S. Bureau of Education. A 36-page account of this interesting school illustrated with several halftones from photographs.

The School Print Shop. An attractive little paper published by John A. Webster of Cleveland, Ohio. Price 10 cents a copy.

Bulletin of the American Home Economics Association. Issued quarterly. Roland Park Branch, Baltimore, Md.

Handbook of Federal Statistics of Children. Bulletin No. 5 of the Children's Bureau, U. S. Department of Labor, Washington, D. C. Gives the number of children in the United States with their sex, age, race, nativity, parentage and geographic distribution.

Nature and Industry Readers. Three books by Elizabeth V. Brown. Published by World Book Co., 1913, Yonkers-on-Hudson, N. Y. One of these books, "When the World was Young," puts into story form for young children a great deal of information concerning the life and industries of primitive peoples. First is the "quest for food," then primitive dwellings, "queer clothes," workbaskets, etc.

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THE ADAPTATION OF MANUAL TRAINING TO COMMUNITY NEEDS.

EDWIN L. TAYLOR.

IN considering the adaptation of manual training courses to community needs it is well at the outset to remember that we are not opening up any new idea. American education has always included manual training in its curriculum and whenever this manual training has been successful it has invariably been very closely related to that local unit of organized human society known as the community.

Our first courses of manual training were not recognized by the schools. They consisted of the rough but courageous toil of those brave men and women who, back in the strenuous days of our colonial history, penetrated the dense primeval forest and blazed the trails that are now the teeming highways of our commonwealth. Even in much more recent times the quite scanty curriculum of the little "red school house" combined with the imperative tasks of an isolated farm furnished the educational basis upon which many successful and some eminently great men have laid the foundations of their careers. To be sure the manual training comprehended by this limited educative process had not then been reduced to a "series of logically related tool exercises" embodied in either an "abstract" or a "concrete" course of "models," but it was unquestionably very closely adapted to the needs of the young man's community and it must have been an efficient complement to the "three R's" for the point is that together they did the business. We say that such men as we have referred to were self-made men. This is not quite the truth. They were at least rough hewn into the likeness of useful members of society by this most wholesome school of experience. The point in this connection that is pertinent to our theme is that the manual

element, the "manual training" if you please, that was included in this elementary course of study was perfectly articulated, rather it was identical with the homely and imperative needs of the community life.

The community of the early days of our national life was much more easily segregated for analytical purposes than is the complex community of our day. A much smaller number of people then composed a community unit, for specialization and transportation as economic factors were undeveloped. Each country homestead could easily exist by itself, if need be, for a whole long dreary winter with never a demand upon the outside world for the necessities of life. Manifold were the tasks of this miniature community and it is not difficult to understand how they provided a wonderful course in manual and domestic arts for the young people, a course that was in every sense of the word adapted to the needs of the community.

But with the development of easy communication and transportation the boundaries of the community rapidly widened. Transportation made competition possible; competition produced specialization, and specialization in turn produced the complexity of present time economic existence, until now there is no such thing as an industrial community complete unto itself. The members of the present day community are all specialists. The only approximately general industrialists that I can think of are the housekeeper, the farmer, and the school janitor, and these three are so far affected that any of them would promptly resent being called a jack-of-all-trades.

If adaptation to community needs is interpreted as the furnishing of a preparation for the manifold vocations that arise in this specialization, then adaptation will never be attained. Such a program would mean the duplication of our myriad specialized industries in the training afforded by the school, and their very multiplicity precludes this as a practical impossibility. Of course there are some large towns with predominating industries where the problem is comparatively easy to solve, and then there are always a few definite trades or vocations represented in every community that provide an apparently logical basis for vocational courses. But I will venture a guess that, could the facts be ascertained, we should find that the majority of pupils benefiting by such courses ultimately engage in some other calling than the one foreordained for them by virtue of their school training.

America means equal opportunity. That is the meaning of our democracy—at least that was the original intention. Industrially, how-

ever, America as she is today falls pitifully short of this ideal; but youth is ever optimistic and by far the majority of our schools are, fortunately for the future, made up of pupils who insist upon being just "general purpose" youngsters—those youngsters who have not yet been pigeon-holed by fate, by adversity, or by the vocational guidance expert—who insist that they be allowed that greatest of all educational experiences, the privilege of finding their own bearings, unhampered by school, or State, or social conditions. It makes no difference how early or how late the course of school experience may end, from a democratic point of view, that course is a failure if, after having endowed its graduate with certain fundamental ambitions and resources, it does not leave him a future to make for himself.

Beside the spirit of true democracy that must underly all of our education there is another generally accepted theory that argues against too abrupt a diversion of adolescent training into specialized channels. This theory holds that the growth of the individual epitomizes the growth of the race. Specialization is the last word in our civilization, the attribute of a mature humanity. The very soul of youth protests against it. Curiosity, adventure, the desire to try the unknown, the chafing at present restrictions, are primal human instincts and primal instincts are forces implanted by nature to lead expanding life along the pathway of development. To throttle, then, this experimental instinct of youth means the arresting of development. This call of the untried coming to us out of the rosy mirage of the future years is God's device to spur us on to larger life. These things explain the constant, restless striving of humanity—our oft-repeated, toilsome readjustment with environment by which humanity keeps up a sort of rotation of crops that prevents the otherwise "small potatoes and few in a hill."

THE HOME THE TRUE BASIS OF CORRELATION.

Now when we interpret the needs of the community in terms of the needs of modern, specialized industry and attempt to fit our manual training courses accordingly, the foregoing are some of the conditions that rise up to render our efforts abortive. It is clear that the healthy correlation that we so much desire between school activity and community life must be based upon some other conception of community needs. And here follows the solution of the problem. Communities analyze much more easily into homes than into industries. All true

homes have constantly arising needs that must be as constantly met by the members of the family. Just as these homes in the composite make up the community so these needs in the composite are the needs of the community. Now the providing for these needs by the members of the family sets up that activity that is one of the first essentials of true home life, and the wisely trained boy or girl has his or her part in this activity. The community of our theme is their community. It is not the political, geographic, industrial, or social institution that we have fancied it to be, but it is rather that composite environment that reacts upon the separate lives of our individual pupils. And for each separate life there is a different reaction, consequently the needs of the community will receive as many different interpretations as we have pupils. This analysis easily places something tangible before us to work upon should we as teachers desire to make our manual training something vital to the lives of our pupils, something worth while in the community.

Having thus defined the true source and character of community needs, let us next inquire what may be the true nature of manual training? Going back into history we find that its first beginnings in American schools were from two foreign born ideas, the Sloyd and the Russian systems. Our American version of the one was a set course of models; of the other a logical course of tool exercises. They were seized upon because they were manual exercises logically arranged and ready to serve. The logical sequence of the traditional subjects camped upon the trail of the new idea, and like them it promptly became academic and stereotyped. We lost sight completely of the most important truth, the fact that Sloyd was a system of handicraft perfectly adapted to Swedish rural home life, and that the Russian system was perfectly adapted to the Russian shop schools. The virtue of either course lay not so much in its content as in its perfect adaptation to certain definite conditions. Thus we missed the trail at the very out-set thirty years ago, and some have been pretty much in the woods ever since.

TRANSCENDENT IMPORTANCE OF MOTIVE.

It is not the content of manual training that contains the essence of its educational value but rather that it embodies the possibility of a perfectly natural correlation of school activity with contemporary needs arising in the environment that surrounds the life of each individual pupil. In other words the key to the educational value of manual

training is the motive behind the work, not the means by which it is done. Motive is the inception of a more or less complex phychological, industrial, social, and ethical process culminating in an ultimate result. It is the desirability of the result combined with the fascination of pursuit that sustains the interest. It has been said that the greatness of human character is measured by the sum of its concious needs. May we not conclude therefrom that the greatness of manual training as an educational medium lies largely in its ability to awaken adolescence to a consciousness of the material needs of community life. Seek ye, therefore, the motive with its associated result and all the rest shall be added unto you.

The usableness of the finished project must be our prime consideration. The so-called subject matter, the technical features of manual training are incidentals of importance to be mastered because they are essential to successful results and consequent community good, not because they are the elements of some trade or vocation into which the pupil is later to be thrust.

Manual training serves a purpose different from that of technical, industrial, or vocational training. Their motive is the acquisition of technical ability for some definite purpose at some later time. Consequently they should employ carefully and logically arranged courses of technical subject matter leading to some definite place in the specialization that prevails in the industrial world. Manual training, on the other hand, it might be said, has no need for courses of work in precisely the same sense. Its order and sequence are automatically established by that simple law that associates the new with the related old and by the law of the natural growth interests of the pupil. Instead of sequential courses and doddering, pottering accuracy it should provide the facilities and the inspiration that will get something useful done, get it done because it is needed, and get it done well and quickly. Let us say then that manual training is a practical purpose subject, calculated to serve as a clearing house for adolescent activity and home, school, and community needs, intended to train young people not only to be good but to be good for something, thereby fostering in youth a spirit which rejoices in the honor, dignity, and opportunity of any honest labor.

VALID CRITICISM SHOULD LEAD TO IMPROVEMENT.

Now manual training has been from its inception mistakenly or ignorantly advertised as a panacea for nearly all the ills of popular educa-

tion. Of course, thoughtful persons have never made such claims nor expected such results but it must be admitted that the subject as taught has not always produced the most flattering satisfaction. Personally I have heard much of the manual training of our own state (New York) subjected to decidedly adverse criticism, not by the lay public but by educators who were in a position to judge intelligently, who are entirely in sympathy with practical education, and whose opinions are held in state-wide respect. Judging from the mirror held up by such critics and by current popular and pedagogical literature, much of our manual training from the standpoint of the "man behind the taxes" is a "game that is not worth the candle."

Mr. General Public, who foots the bills for popular education, has been assured that manual training is a practical subject. Consequently he looks for practical results, and when he discovers that his son, John, who finishes high school in June, cannot mend a bicycle tire, pack a faucet, wire a door-bell, repair a broken chair, or sharpen a kitchen knife, he naturally becomes skeptical. To be sure John has brought home a number of affairs that he calls models, many of which were relegated at once to the attic. Some of the models that escaped the attic, and made an attempt at actual usefulness, promptly broke down under the strain. But when John desired to frame some pictures for his den, to build a Morris chair for his father's Christmas or to mend his mother's ironing board, he was too frequently told that the regular course could not be interrupted by such work, and besides he was not enough of a mechanic for things of that kind—as if a fellow could "learn to swim and not go near the water." Too often the boy has been made subservient to the sequence of the course, and the natural articulation of the subject with the home interests has been deliberately set aside. Much manual training not only takes no account of home, school, or community needs, but considers their projection into its activities as exceedingly detrimental. Thus the real, live, human heart of the scheme is set at nought and that part of the curriculum that by nature could be made to glow and sparkle with genuine human interest is made in very truth a course in "wooden work."

On the other hand, let us look on the bright side. There has surely been a gratifying measure of success. The reason is easily evident. Where this success has been attained manual training has been to the pupil a living, joyous, usable thing, brought closely akin to the needs of the community as he has seen them thru the morning light of youth-

ful vision. Manual training has been articulated with the needs of the community as those needs have been understood by the pupil. Plainly this consummation is not only highly desirable but practically imperative. Such being the case suppose we review some of the conditions that must accompany such articulation.

MUCH CRITICISM HAS BEEN UNFAIR.

As it is now we are allowed in most systems where manual training is included, perhaps a maximum of three forty-five minute periods per week, 108 periods per year of 36 weeks if none go by default. This means a total of slightly over 10 eight-hour days per year. Remember in this connection too that these periods are disconnected, and that consequently a considerable amount of time is lost in the ceremony of opening, closing, and passing of classes, to say nothing of that consumed in getting ready to work and in putting things away and cleaning up. A conservative estimate must place this waste at at least 25 per cent, and this leaves us with seven and one-half days per year, or less than two months all told in the 6 years comprised in the seventh and eighth grades and high school. A total of less than two months of all the periods of adolescence devoted to so-called practical training! Absurd? Most assuredly. And yet manual training has been severely criticised by the public because, with this pitiful allowance of time, it has failed to produce capable mechanics.

Now it goes without saying that this time allowance is insufficient when it comes to getting anything needed done. The day of its usefulness would be far spent before the work was well begun. It is plainly evident that to secure results at all satisfactory the time devoted to manual training must be greatly increased. Unless we can unload some of the other work from the curriculum there is no solution to this dilemma except to teach the manual training after school, on Saturdays, and during the vacations. Personally I have deliberately made this a practice, and I am convinced that the work thus accomplished has been superior to that done in the regular class periods, both in the educational value to the pupils and in the practical value of the product.

Perhaps this practice is not entirely commendable but this much is certain. If the manual training has any vital articulation with the needs of the community it will outgrow three forty-five minute periods

a week, and pupils and teacher will often be found in the shop out of hours. The shop, moreover, will lose its traditional primness and take on a measure of the orderly disorder that indicates use, and there will be a deal of chips and shavings and sawdust, and some work under construction far too large to pack neatly away in the instructor's cupboard.

MAKE THE MANUAL ARTS SELF-SUPPORTING.

If there is an increase in the time devoted to the work there will be a corresponding increase in the materials used and it will soon be necessary to make the manual training department self-supporting to a large extent. Gary, Indiana, boasts of this achievement, and the State Normal School at Plattsburg, New York, has a department that meets all running expenses except those for instruction, and the idea, I am sure, is not unheard of in many other places.

When, as Mr. Anthony of Fitchburg, puts it, "Real life is brought to school," pupils will no longer potter for a whole term on some trifling model of an ugly book-rack, painstakingly following a painfully prepared and meaningless drawing, by an equally painful and joyless series of steps according to some pedagogical, psychological, logical, and scientific order of analysis laid down by the worship of sequence. Such work is inexpensive both in the material involved and in the teaching energy required to present it, and it is worth just about as much as it costs—next to nothing. The youngster should rather be given the chance to work out some man-sized conception of his own that is to fill some man-sized need in his community. The mechanical analysis involved will be the result of the pupil's own thinking—thinking that is brought out by the same methods that are used in developing any other well-taught lesson.

Such teaching requires individual instead of class instruction. To be successful the teacher must be in entire sympathy with the interests of each pupil. He must become responsive to each separate home environment. Then when, together, pupil and teacher have planned and undertaken the job the teacher *must* lead to success. To do this means the *patience* that will share with the pupil his failures, and with him profit by them; the *good sense* that abandons the hand-made fetich for the labor-saving machinery and the processes of real life; the *perseverance* that helps patch up the blunders of inexperience that beget discouragement; the *comradeship* that rejoices with youthful delight in ultimate

accomplishment; and the *self-effacement* that does the teacher's part in such a way that the pupil will respect the finished job as the product of his own plans and labor. This is true teaching—the task that we would set for him who would seek to adapt manual training to community needs.

WHAT THE SELF-SUPPORT PLAN INVOLVES.

Now as to the expense of the materials involved, permit me to affirm that manual training that cannot easily be made to pay its way is absolutely indefensible. What is worth having is worth paying for. Of course, we will strike the argument that the schools are of a public character supported by popular taxation, and that somewhere in this argument lies a reason why it is wrong to ask pupils to pay for the materials they use. What the taxes are for is to provide instruction, not to provide charity that is not needed. When young people produce things involving commercially valuable material, and because of their usefulness claim those productions as their own personal property, then it is certainly due to their self-respect as well as to sound pedagogy that they pay for the materials used. The moment this arrangement takes effect certain standards are set up that otherwise do not prevail.

To begin with the product must be of value when estimated by grown-up notions, else the home will refuse to pay for it. In endeavoring to attain this standard the pupil necessarily makes the most rapid growth possible toward maturity of thought and action—a growth that we must concede to comprise in a large measure the aim of all educational activity.

The product, furthermore, must be valuable in the light of the needs of each separate home involved. This introduces a variety otherwise impossible, thus enriching the content of the work and correspondingly the experience of the pupil.

Then again, the work that is worth paying for must be well done, thus the self-supporting basis automatically establishes a high standard of workmanship. It is a clear case of economic waste, if, in training a youngster to work out his adjustment to the needs of the community he is not taught to apply the up-to-date labor-saving methods of the practical workman. Now the methods of the workman in real life are vitally related to the money value of his craftsmanship. Apply this same criterion to the products of school activities and only sensible projects and thoro workmanship will be the natural output.

Now with the time devoted to manual training increased so that really practical projects can be undertaken; with the motive for the activities springing strong and vital from the pupil's community relationship; with the results of the pupil's work tested by the standard of usefulness, and his expense account so taken care of that he is neither a beggar, a public charge, nor a juvenile grafter—and presently there develops in our youngster the unmistakable air of a man of business. He has found himself, has discovered a tangible relationship between himself, the things he is able to do, and the community in which he lives with its many and varied material needs. Such a boy is more than likely to show up some fine day with an "order" that he wishes to fill and for which he is to receive compensation. Then real life has come to school in earnest.

"Order work" undertaken in the school shop is proof positive that manual training has in reality been adapted to the needs of the community. It is conclusive evidence that pupils are acquiring skill and habits of industry and thrift; that the work produced is of excellent quality, if not superior to similar work to be found ready made in the open market; that the school has actually come into such close touch with the community needs as to compel the community's attention, earn its respect, and enlist its cooperation. To many the idea of filling orders in the school shop may appear like "unsound doctrine." Nevertheless, the idea is entirely defensible. Not only does it indicate a healthy state of affairs, but it enriches the content of the subject, develops the pupil's business sense, and may be to him a legitimate source of revenue that will prolong materially his school life.

But if order work is undertaken by our well-ordered and enterprising manual training department, it is understood that none of the needs of the school that fall within the capacity of the equipment should go elsewhere to be cared for. The school itself is certainly that part of the community whose needs demand the first consideration. Yet there is many a manual training teacher, even at this late day, whose sense of the fitness of things is so blunt that he declares emphatically that his department is "no repair shop"; that "it does not in any sense exist for the convenience of the school"; and who bids the long suffering janitor with his perennial tinkering to keep on his own side of the fence. Permit me to affirm that there is something radically wrong with a high school manual training department that does not take care of the bulk of the school's repairs. Not only should the manual training de-

partment look after the repairs, but it can easily produce much of the new equipment. Its own equipment should be intelligently planned with these things in mind.

DANGER TO BE GUARDED AGAINST.

But there is an element of danger in this scheme of adapting the manual training to the needs of the school—the danger that some one will forget that the school exists for the pupil, and not the pupil for the school. Of course, it is needless to say that the prevailing spirit of the time is that which asks "What will I get out of it," a spirit that aims to do that which is required but no more. Youth should be taught that the pathway to success is not trodden by men of this stamp, but rather by those whose evident spirit of usefulness renders them indispensable. But there is very little difficulty in securing in pupils that spirit of loyalty, of helpfulness, of school pride, that will lead them to do willingly the work that is needed by the institution whose only excuse for existence is to render service to them. But, pupils who are capable of doing work for the school are generally a special few whose diligence and application both in season and out of season have developed in them a degree of skill and judgment above the average. Such pupils are not as a rule the ones who live in the lap of luxury, and the spirit of fair play should allow them a fair remuneration for work involving skill and any considerable amount of time.

The last and most important requirement in the adapting of manual training courses to community needs is the teacher, and that teacher must be a democrat; that is, he must be a man who believes in democracy in education, who believes that for the majority of American youth that educative process is best that is so general in its character that, when it is built upon according to the judgment of maturer years, it will support whatever life structure that natural aptitude and the opportunities of a democratic social order may afford. He must understand that industrial efficiency without industrial democracy is weak; that coupled with productive ability must be the ability to share intelligently "in the responsibilities and benefits of organized society."

He must be in love with his work. I once heard a so-called teacher of woodworking say, when some bit of school repairing presented itself, that he "wished they would keep that kind of work out of the shop," for *he* "always had hated carpenter work. What *he* was there for was

to teach manual training." This sort of a teacher will not find pleasure nor be of use in our scheme of adaptation.

Our teacher must be able to bring the practical methods of real life into the school shop, for we propose that the product of that shop shall be practical things for practical purposes, and practical things come only of practical methods. The teacher therefore must be a practical man, but he must likewise be a visionary man, for he must be capable of remaining perennially young that he may always see the visions of youth, for he must understand that he is teaching *boys* and not carpentry and joinery or any other such thing. Many other things must he be, but chiefly among them he must be a minister. I do not mean a clergyman, but a minister in the sense that the Great Teacher had in mind when He said "If any would be great among you let him become your minister." His must be the ministry of service, for he must not only comprehend and minister to the educational needs of his pupils, but it is necessary that he seek out and understand the needs of the community that he must use as the basis of his pedagogical practice.

Now we have segregated the community and analyzed it into tangible elements; we have discussed the nature of manual training and pointed out the interrelation of one to the other. We have noted some of the conditions and advantages that arise when this natural relationship is consistently considered, and we have hinted at the qualities that must be found in the teacher who is able to adapt a course of manual training to the needs of a community. Theories generally precede practice. This theory is the outgrowth of practice. Its essentials have been tried out and we know that they will work.

A METHOD OF PRESENTING MECHANICAL DRAWING.

ROBERT I. MINER.

THOSE of us who have to do with the teaching of mechanical drawing in high schools, trade schools and even in the intermediate grades, have, I believe, come to realize that it is not so much a matter of how much technical ability or commercial knowledge we have at our finger tips, as it is the manner in which we train ourselves to take the viewpoint of the young student, and present the phases of the work in progressive and logical order as they would be presented to him in practice. The demand that the schools make industrial subjects practical is a just one, and altho we are but laying a foundation, this foundation must be laid in practical form if the results attained are to be measured by the ability to represent to the workman what he needs to know about some project.

The problem has been approached on the part of officials in two ways: either a school drilled man has taken up the work, and sometimes failed to arouse and hold the interest of the classes because he lacked in commercial knowledge and ability; or a journeyman has been called in to supply that desired practical atmosphere, and many times failed because, altho possessed of superior technic, he lacked pedagogical training. These conditions are being steadily overcome by the careful selection of men from both of these classes and especially training them for teaching practical subjects. The school man is given practical experience, and considers in presenting a project to a class whether it would be done that way in practice; the practical man is trained in pedagogy, and understands something more vitally important—that of order in presentation.

If mechanical drawing is, as it has been appropriately styled, the language of industry, then truly there is a demand that it shall not fail in presentation and understanding from either the orderly or the practical standpoint. The conditions under which each of us works must determine our methods, and we have need to be big enough to compass them if our work is to bear the stamp of commercial approval. I propose to state certain conditions in this paper, and tell how they were met, in the hope that I may evoke helpful comment and perhaps offer helpful suggestions.

I came to my present position to organize a department of mechanical drawing in a school where the subject had been taught as a part of the work in the art department. Thanks to my supervisors, I was given a free rein and told that, once established, the classes would come under the scheme of examination by the State Regent's Department. This meant that a definite suggested outline was to be followed; that is to say, that certain ground must be covered in a certain time, and the students examined at the end of that time upon that ground by disinterested and competent parties from outside. The State Department outlines a comprehensive course with full possibilities for thoro grounding in applied forms of drafting, if the possibilities in the suggestions are realized.

MAKING THE WORK PRACTICAL.

I have since been thankful that I had some practical experience coupled with a college course in engineering and teaching. To me it is the ideal preparation for this work, and I make this statement in view of the fact that I found I was able to appreciate the difficulties encountered by the mechanic in daily work, and by the technical man lacking practical experience. The first step was to bring an atmosphere of practicality into the room. I visited local establishments, and as is generally the case, found them glad to contribute pieces of machines, models of patterns, and blueprints, many of which were large enough to frame and place on the walls. From outside the city others were secured, thus establishing a wide outlook with local interest predominant, and the boys were interested at once.

The next move was to lay out the course in accordance with the outline. The question immediately came to mind "How shall I give the problems to the students, bearing in mind that there are sure to be varying abilities?" That meant a collective presentation of the phases of the course, and an individual presentation of each specific problem. I had a library of textbooks on drawing, and many problems that I had worked out myself; but this did not tell me how to go about presenting the work I wished to have done, merely supplying the material for the start, as it were. I knew that one of the first things a young draftsman would be called upon to do in a drafting room would be to make a neat tracing, and to letter neatly and quickly. I wanted blueprints. So, seeking the school repair shop, I made a blueprint frame large enough to print four of the finished plates. I traced a plate of simple

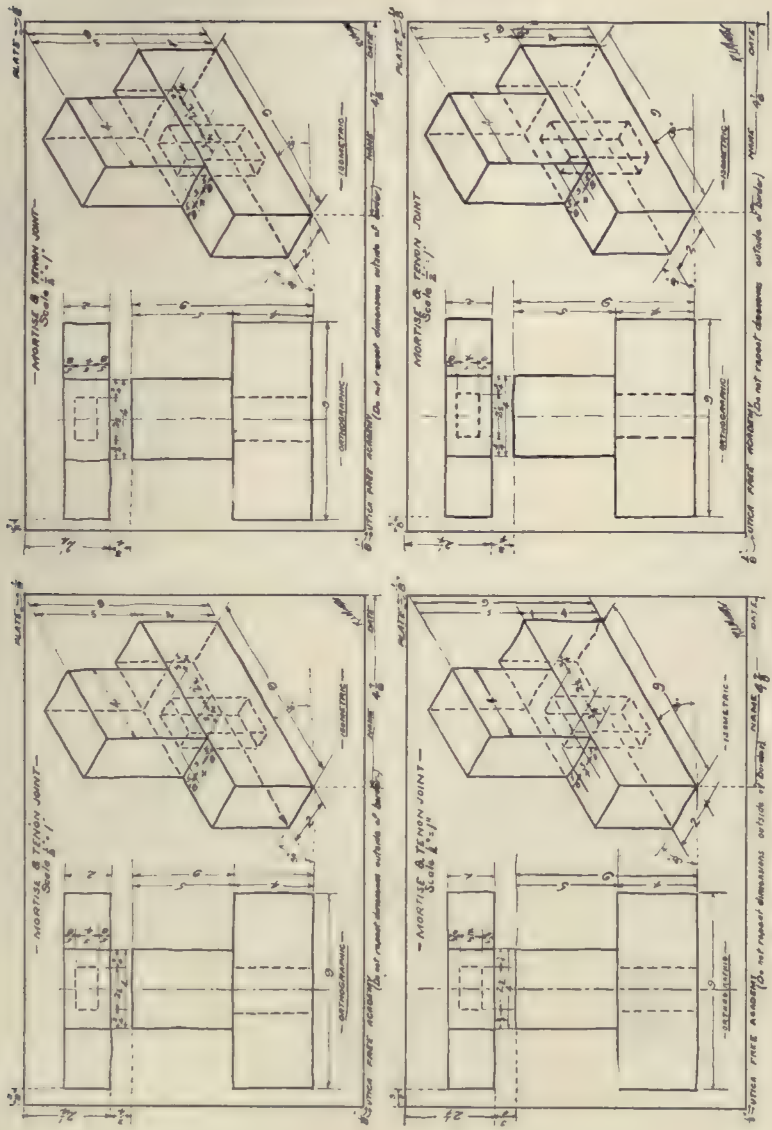


FIG. 1. TRACING OF THE LARGE SHEET, CONTAINING A PROBLEM REPRODUCED FOUR TIMES IN MINIATURE.

lettering, and giving each student a sheet of tracing paper, taught them the forms of the letters by having them trace them in ink, following this work with one or two simple drawings to set a standard of the way I wanted the finished work to appear. This was enough of copy work.

My next recourse was to the blackboard. That worked very well until I found that the different classes and the relative ability of the students made necessary more space than I possessed, since much work had to be retained for a time, and more was needed. I had the students sketch my work in note-books. This was practical, I felt, but I found that they were not yet ready for it, needing to work still longer from another's sketch, to see how those sketches grow more from the prospective object. I did not wish to give them more full size drawings to copy, and finally hit upon the scheme which is to be the main subject of my paper. The plan allows the students more time to actually work on the problems, and gives me the time necessary for individual instruction, which I feel is most helpful to the student.

At first I made my sketches about half the size of the required plate when finished. I laid out a sheet with four of such spaces, in reality providing for four miniature plates, Fig. 1. Tracing freehand four times and adding a Vandyke print of this sheet made it possible to produce eight prints at one exposure. These prints were cut up into small plates, and given to a student one at a time as fast as he was ready for them. I was able in this manner to leave much work as problematical, only suggesting the solutions, and leaving the solution to the student. Observation of the work in progress led me to believe I had taken a step in advance again; I felt that the students needed the stimulus of properly executed example for a longer time. Accordingly, I reduced the drawings to scale, and executed the small tracings with instruments, Fig. 2, using the sketched prints when the work was further advanced. Many will say this is a laborious method, but there was need to produce my problems quickly. With time ahead to plan, it has been simplified by making four different tracings on one of these sheets, and having the printing done outside. I propose at the beginning of the next term to place in each student's hands a complete set of instructions made in this manner, and bound so that additions may be made as they may develop.

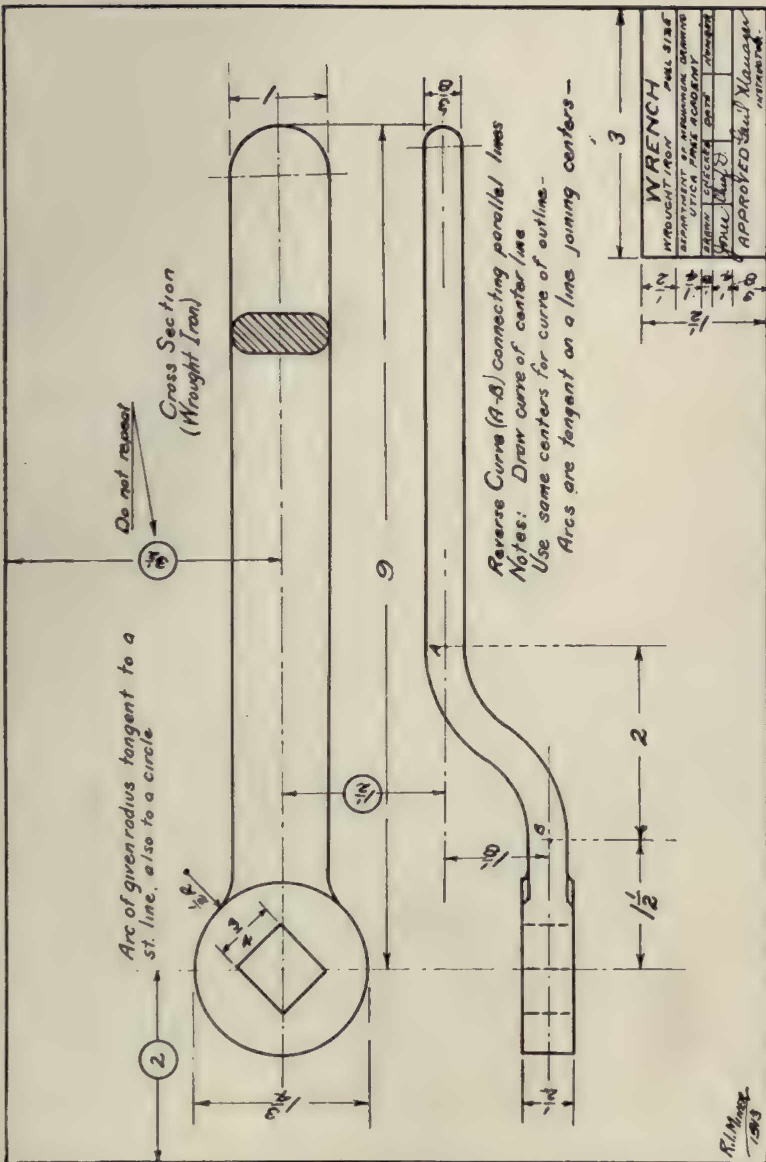


FIG. 2. PROBLEM-SHEET DRAWN TO SCALE AND EXECUTED WITH DRAFTING INSTRUMENTS. ONE-FOURTH OF THE SHEET ONLY IS HERE SHOWN, THE ARRANGEMENT BEING SIMILAR TO THAT IN FIG 1.

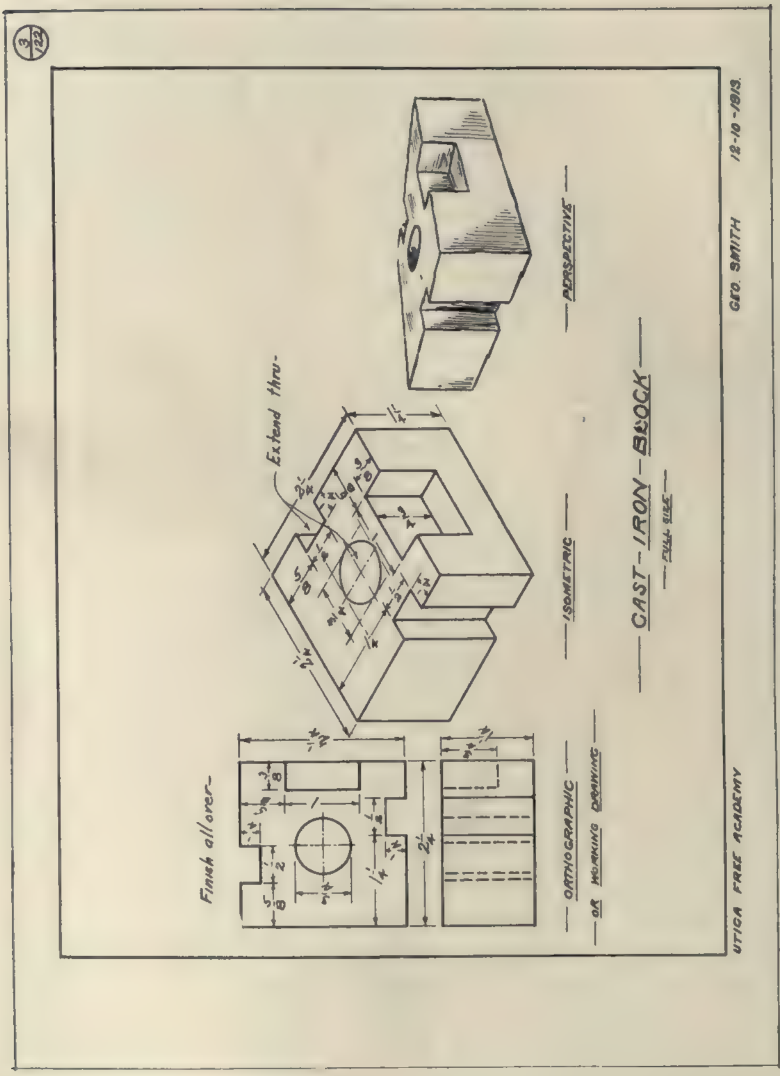


FIG. 3. A STUDENT'S FINISHED SHEET.

GEOMETRY AND MECHANICAL DRAFTING.

A few words about the ground covered may not be amiss here. One cannot proceed very far in drafting before a knowledge of geometry as applied to drafting is recognized to be essential. The students are given sketches of the abstract problems considered necessary, working them in pencil on ordinary practice paper from the explanations lettered on the sketch. When this work is finished, the students are taken into another room, given a straight edge and chalk and string, and required to work from memory until each has demonstrated his understanding of the principles. In the drawing room, they are then given problems at first suggesting the application of the geometric principle, finally working from problems requiring a knowledge of the principle or principles involved.

The Regents have recently allowed us to discontinue these problems as specific plates, and I feel that this is a wise move, as the value of these problems depends upon the ability to apply them. It is insisted by many that the finishing of these problems in ink, and with conventional lines, is an unfailing developer of execution. It seems to me, however, that it belongs to a course in geometry, and that where an instructor is on hand to see that each individual is held to execution of high order the time is better spent in learning to apply the principles.

The Regent's outline calls for definite projects in woodwork and machine parts in the first year's work, with privilege of selection or design left to the instructor. Many are designed by the students themselves, the description of what is wanted, the purpose for which it used, material, and steps in making, being furnished to them in typewritten form. A freehand sketch of the object is furnished and often the working drawing is accepted freehand, as in the case where a rapid sketch is required in the shop. As the work progresses, problems are approached from all sides; the student is given a perspective sketch and the working drawing required, or vice versa. The students are taught to separate parts of assembly drawing into details, or to arrange details into an assembly, and to figure bills of materials. They are shown some of the methods of workings from the drafting room to the shop, and while it is impossible to give instruction in shop practice in a school lacking shop equipment, visits to the engine rooms have shown many of the parts we draw in use, and it has been possible to demonstrate to the pupil that there is a definite connection between the drawing room and the shops, and that material, time, and labor have a money value.

ORTHOGRAPHIC PROJECTION.

The work of the second year deals largely with the theory of orthographic projection, and most of the work is given in data form, with explanations. The isometric drawing has been most helpful in establishing the relation of the planes to the object, Fig. 3. Developments, intersections, and their application to sheet metal have been studied with the aid of prints for suggestion, and typewritten sheets for data. Patterns have been cut from bristol board, and advanced work of this year is traced and blueprinted in accordance with commercial practice, and the student instructed in drafting room practice of caring for, and indexing drawings. In the latter part of this year we lay the foundation for more advanced machine drawing, and catalogs of commercial articles are secured of such things as bolts, nuts, and screws. Much data is found in handbooks, and the work is given a commercial aspect in figuring which parts are best bought, and which made in the shop.

The third year deals with elementary machine design. Screw threads, gears, and cams are studied theoretically, and from their uses in various mechanisms. A cam demonstrator has been made, in which different cams may be adjusted to a shaft turned by a crank, demonstrating the mechanical changes of motion. Gear trains are cut from bristol board, and elementary mechanics of motion are studied as far as time allows.

The third year will give instruction in either of two electives—advanced machine drawing, or architectural drawing. The plans for a technical high school are now in the hands of the architect; in that school we shall be able to make up for the lack of practical demonstration of the connection between the drawing room and the mechanical process, and doubtless we shall have a course in topographical drawing in addition.

SOME FACTORS IN EFFICIENT TEACHING.

ALBERT F. SIEPERT.

BELIEVING that poor methods of teaching are responsible for many of the current criticisms of the manual arts, it seems appropriate to study the problem of improvement. In the first place, teaching the manual arts must take into account the principles of teaching that apply to any other subject. So we find that there must always be an aim for the work and likewise a method of procedure. Many courses are being taught for which the ultimate aim has not been clearly and definitely formulated by those teaching them. Ask yourself—or the next man you meet—"what is the good of this thing? Why are you teaching it anyhow?" to see if an answer is forthcoming which shows previous thought of sufficient intensity to give clearness of view. Suppose woodwork be taken as an illustration, how many teachers have a definite aim? A beginning is made somewhere in the fifth, sixth or seventh grade. Classes come for one, two or three years to the "carpenter shop" and then leave to enter the field of wage earners, with the exception of those going on to high school. What should these boys have in their possession as a result of their shop experience? Many answers could doubtless be given, but this is not the place to discuss them; the point at issue is, we *must have an aim* for the course if it is to be worth while. It is quite usual to hear theories about aims and also to be told what should be the aim of each year of work. If we stop here we have only touched the problem; it is equally important to plan definitely for each lesson so that it becomes a unit in the larger scheme.

The absence of such aims, regardless of their exact nature, implies a hit-or-miss method of teaching. The *aim* places the work on a high road to success. No aim leaves us to drift on a trackless sea at the call of every passing breeze but never making port. The aim having been formulated, we at once meet the question of what methods to employ to attain it. Since the end can only be gained step by step, lesson by lesson, a decision must be made as to how far we shall advance each lesson and by what method that advance shall be made. This implies that the teacher know (1) how far his class has gone, what they have learned and done, (2) *how far they can go today* and *how much* they need in the way of new information to take the desired step.

ELEMENTS OF A LESSON.

The lesson may be divided into several parts, but it should include at least three elements: *testing, teaching,* and *practice* or *putting into effect the teaching.* Testing must be done by the teacher if he is to do his work intelligently. It should be done by the pupils if they are to learn to depend upon themselves. Testing need not mean, seldom should mean, written examination. Some of it can be done by questions of the right kind, much of it by observation of work being done, and by checking of results.

Teaching may deal with the acquisition of new ideas, facts or processes. In each case the method adopted must be suited to the particular thing to be taught. If, for illustration, it be information as to materials, or an application to industrial conditions the teacher may select the "telling" method, but far more effective means may be found. One method is to have reports given by members of the class. Here the teacher must exercise care lest the assignment or reference be too general or too indefinite. I am reminded of an instance where a text in woodworking was used. The instructor had assigned "the next chapter" for the following lesson but found that he could not pump up any responses from the class. The boys had not even read the chapter, much less mastered essentials. The difficulty lay in the amount and manner of assignment. We have gone a long way from the old blunderbus to the modern rifle, yet there are teachers whose assignments are so far behind the times that they are content to shoot at a whole flock of birds in the hope of hitting one. Grammar grade and even high school students need much help before they can do anything with the university method of research work. Every assignment must be as definite as it can possibly be, with the provision that we seek to train the student to select essentials in his reading, thinking or doing. Finally, the spoken word, or even the printed word appeals to but one set of nerve centers, it arouses but one type of images. Hence the teachers who bring in illustrative material, pictures, slides, etc., who encourage their students to contribute such material as they can secure, not only make their work clearer, richer and more vital, but they also make their work easier thru the interest and life aroused.

The teaching of a process usually requires a different method. It is not sufficient to explain or to study a process to be able to perform the act. It is perfectly good psychology as well as a sound principle of

teaching that one can best learn the doing of an act by seeing it done, by imitation. No matter how much study or verbal explanation precedes an act, the chances for the best results are always improved by seeing the act performed in the right way. Granting that blind imitation without an appropriate background of principles is bad, it seems safe to say that teachers err more by an entire neglect of imitation than by its over-emphasis minus the needed principles. Too often rooms are fitted with an equipment for "work" but not for such a thing as class instruction. The usual result is that we teach not the class or a group but the individual, which requires the repetition of both general and specific instruction to each pupil. When a class numbers twenty or more it is not unusual to see the teacher under such conditions surrounded by a crowd of boys, his hands filled with work brought for his inspection, trying to explain to several students at the same time. No one can *teach* adequately such a class by these methods in the time allowed. He may have the class organized so as to take the routine matters such as material, care of tools, etc., off his hands, but there is still too much repetition to do the most effective work. Class or group instruction on all matters pertaining to the work as a whole supplemented by the additional individual help made possible by thoro class instruction comes nearer meeting the need. This makes the "demonstration" a vital factor—and right here more bad teaching exists than many teachers are willing to admit. If demonstration means "to show" it does not necessarily imply that a "lecture" need be given on every possible related topic. Personally, it seems best to have the pupils prepare for the demonstration by a definite assignment of reading or investigation covering the point. This will make the demonstration what it should be—a clearing up of ideas, a gaining of vivid impressions, the driving home and clinching of facts necessary to the problem in hand. Recently I saw a demonstration of the process of boring holes ½″ deep. The board was placed vertically in the vise, all the work thus being done on the side opposite the class, so that no one could see the placing, position or action of the bit. The teacher took especial pains to explain and show each step in the process of thru boring. After this he told them how to measure for holes ½″ deep, but did not show the process. Here the all-too-common blunder was made of showing a process entirely irrelevant to the problem being constructed; in fact the class was taught the very thing they should *not* do. Again, the whole matter fell flat because the class could not see what was going on behind that board,

and soon two-thirds were not paying attention. It would be a matter of interest to find out how many boys bored thru on their problem and how much time the teacher had to spend to counteract his first instruction. Another instance, to show that limits must be set to a demonstration: The teacher took most of the period for a demonstration; his material was not all at hand, he made no blackboard sketches to clear up obscure details; much of his instruction was negative, "don't." The class did not cover the ground attempted in that demonstration in the six lessons following. Worst of all, most of the instruction had to be repeated several times because students had "forgotten"; and then the finished results showed the poor technique resulting from a lack of understanding. Such cases lead one to feel that the demonstration should be so brief, so well organized that the class can do that amount of work in that or the immediately following lesson. This does not mean that a process must never be carried to the point of completion; in fact, there is a decided value in actually completing a process during the demonstration. This feature is often omitted "to save time," when often the case is that the teacher is unwilling to meet such a test of his ability. For example, suppose it is a case of showing a boy how to use a crosscut saw. Have you ever seen or done this: cutting part way across the board, telling how to start, control and run the saw, and then expecting the boy to saw correctly? Yet you very likely check up his effort by testing with a square. Why not saw all the way across the board and subject your own work to the same test? Or, if the class is about to make a new type of joint, exercise or applied, why not actually make an occasional joint before the class, doing the whole thing in record time, measuring up to tests at least as severe as those by which you will measure the students? It is quite likely that such a proceeding would have as wholesome an effect upon the teacher as upon the class. Too many of us have the reputation among our students of "talking too much." I once had a friend who used to invite me to accompany him to clinics of the medical school at which he was a student. There were given some *real* "demonstrations," everything in perfect readiness, nothing missing, no tool to sharpen before it was fit to use, a man interested and confident in his attitude, a master of technique, every act, every motion definitely directed to the end in view. Never did I see a "job" dismissed half finished with a "keep right on this way until you get it." Briefly, the demonstration must be planned for, everything ready, the work itself done in the very best

possible manner, clean cut and direct. When thru with the demonstration lose no time in idle talk but give every fellow a chance to try out the new ideas cleared up or gained. The teacher by his attitude and technique makes or mars the day, and by his demonstration reveals his power or weakness along one important line of teaching.

The third element of drill or practice is necessary to insure that each student permanently fix ideas or processes firmly in mind. It is his opportunity to test his own knowledge, his own ability to do. How much of drill there need be, and what its exact nature shall be, depends upon both the immediate problem and the general aim. There is no excuse for teaching facts irrelevant to the work in hand, and there is but little of lasting value in such teaching as may be done unless each pupil has the opportunity to put forth some thought, some effort, some response to the instruction he has been given.

SUMMARY.

In conclusion, granting that more time is needed for the manual arts, we can most effectively gain that point by such an improvement of our teaching methods that we prove both the worthwhileness of what is being done and the possibility of greater things if time permitted. This we can accomplish by having a definite aim in view, by such a careful arrangement of work that each year is worth while for its own sake as well as to serve as a basis for what may follow, but above all remembering to set a stake for each day's accomplishment and then making every effort, every act count so definitely toward that end that the student may know and feel the joy of constant growth and achievement, while we at the close of the day "lock up shop" with the consciousness of another day's work honestly and efficiently performed.

MADE BY EIGHTH GRADE BOYS, TRENTON, NEW JERSEY, W. R. WARD, SUPERVISOR.

MANUAL TRAINING FOR AGRICULTURAL SCHOOLS.

C. W. Knox.

THE radical changes necessary to effect the transformation of the old type of school into the new were not made without mistakes, and many educators laid themselves liable to criticism and ridicule in the attempts they made to carry out the new idea. However, thru all the stress of introducing industrial departments into our schools, the greater number of pioneers moved wisely and well, meeting the problems that arose with commendable foresight and wisdom, so that now the question is not whether industrial subjects should be taught in school, but how and to what extent. With the firm establishing of the idea that this is a legitimate field for the school to enter, comes the question of courses of study for various communities.

The subject of agriculture probably requires the most elastic course of study, for that depends almost entirely upon local conditions such as soil, markets, etc., and not infrequently schools but a few miles apart are offering very different courses. Manual training is for the same reasons a subject that must be adapted to local conditions. The course of study that would be most feasible in a manufacturing center would obviously be out of place in a rural community, and courses vary with the activities of the people even there.

What is true in general of manual training is true as well in the shops of the agricultural school. The equipment should fit the work to be carried on. It should be ample and no more, and all tools and apparatus should be of the best quality consistent with true economy. Nothing is ever saved by buying inferior articles because the initial cost is less. Pupils should be made to realize that as a part of their instruction. Teach the pupils to respect a good tool and, as early as possible in the course, have them individually care for and sharpen them. Have them bring dull tools from home in order that they may have ample material to work on when filing saws or sharpening other tools. The average father is only too glad to have his tools in good shape.

Everything taught in the course must be in accord with the best practices of artisans who earn their living at those trades and above all things no careless and slipshod workmanship should be tolerated. If the course is to be of maximum benefit to the pupil, he must realize that only his best is worthy of leaving his hand, and it ought not to be

necessary for the instructor to have to condemn pieces that are going into a finished product. When the boy has reached the stage where he will voluntarily sacrifice a piece rather than attempt to put it in and trust to putty, paint, and good luck, a great step has been taken.

MATERIALS.

A survey of the rural community usually shows that three materials are most important to work with there, namely: wood, iron, and cement. To make an exhaustive study of the possibilities of copper, brass, clay, etc., would be manifestly a waste of time. All materials should be studied in their places, either before working with them or while working at them. It is important to know how trees are made into lumber, how the lumber is dressed, piled, and cured; to know that different woods have different characteristics, and that what may be best adapted to one purpose may be almost worthless in some other place. The subject of mining and smelting iron is both interesting and valuable to the pupil, and the Bessemer process offers a fine field for a lecture period. A study of the origin and manufacture of Portland cement is a great aid to interest pupils in cement work. I am tempted to enlarge on this part of the subject, to tell of the interest to be aroused in a class thru discussing the history and making of tools, but the cultural side of the subject may be left to others. In passing tho, let me say that wood, iron, and cement take on new meaning to the boy who knows their history, and the square and hammer mean something to him if he knows a few of the possibilities of the square and the history of David Maydole.

Without doubt the state high school inspector took good ground when he said that the products of some of the Minnesota high school manual training shops savored too much of the domestic character, and that there was not enough of the rugged outside world in it. Especially should the work of the agricultural school shops be largely of the outdoor type. Instead of a list containing only furniture and household articles, as good a list of projects, to get all of the common tool processes in their natural order, can be evolved from the following list: Farm gates, poultry crates, ladders, hay racks, sawbucks, eveners, whiffletrees, tables and benches for use in the laboratory work of the classes in agriculture, cabinets for the schoolrooms, corn trees, germination boxes, models of silos, correct house and barn construction, cement blocks,

fence-posts, and tanks. All of these are splendid projects for the agricultural school shop. I have no objection to the making of furniture later in the course, and I believe that the finer joints and wood finishing may well have a place in the course.

The use of linseed oil and white lead should come early in the course, and the boys should actually paint and putty surfaces so that they may know well how to mix the ingredients and how to apply the product. They should know the value of painting the exterior of their buildings, and that the time spent in painting them would return large dividends, in the conservation of these buildings.

COURSE OF STUDY.

If all the pupils of school age could attend regularly, the problem of getting the proper instruction to them would be greatly simplified, as a regular course may be offered thru the 7th, 8th, and high school grades that will fit the needs of the pupils. Such a course would have woodwork and rope work in the grades; carpentry, cement work, rope work, mechanical drawing, forging, and if time permitted furniture, in the high school. The first and second year of the high school course should include carpentry, mechanical drawing, emphasizing the architectural side of the subject, the care and sharpening of tools, and projects of the house and farm that would lead to a knowledge of good processes; cement work and forging in the junior year, with machine drawing to supplement the work in farm mechanics given in the agricultural department. Furniture and wood finishing may be offered in the senior year.

THE SHORT COURSE.

Unfortunately we cannot have all, or even a majority, of the boys for nine months each year and many of them we meet only in the short course if at all. The short course of fourteen to sixteen weeks, should be made as practical and comprehensive as possible and the work so planned that the work of the following year will supplement and add to the skill and knowledge attained at a previous session. The work can be chosen from the following: rope work, woodworking exercises that will permit of teaching correct tool processes, cement, simple forging and welding, tempering, use of taps and dies, care and sharpening of tools, use of tin shears and blow torch, soldering, painting, etc.,—

in short those things of practical value to the man who will use them in his everyday work around the home and on the farm.

WHAT THE BOY SHOULD KNOW.

In closing, I submit here a partial list of things that boys, who have finished the agricultural high school ought to know:

That wood filler is not intended to fill bad joints and ruts on the surface.

That washed gravel is best for use in mixing cement, etc.

That old fence wire and rods from worn out farm machinery are valuable for reinforcing concrete.

That it is poor economy to shirk doing a thoro job of mixing when using concrete.

That too much water is as bad as not enough.

That too low temperature and concrete work will not mix well.

That a dirty fire and burnt iron usually go together.

That a weld may look good on the surface but not be perfectly sound.

That the time to "jump onto" a weld is while the welding heat is there.

That pounding the anvil does not help to shape the iron or steel.

That in shaping steel it will not do to hammer all sides of the piece.

That if desired to temper in oil, it is not necessary to put the steel in "red hot".

That paint scientifically weighed and ready mixed may be as good as the boys themselves can put together.

How to detect adulterations of linseed oil.

That benzine or gasoline may make paint spread easily, and go a long way, but that it does not help its wearing qualities.

That the best primer is not made from cottonseed oil and yellow ochre.

That the stiffness and contrariness may be taken out of a sisal rope.

That tarring or otherwise treating a rope detracts from its strength.

That a soldering iron must be kept clean.

That muriatic acid and blow torches are not to be left around for children to play with.

That the regular blacksmith, carpenter, painter, and architect can do better work and more of it than boys can, but that it is a comfort to realize that the latter need not be entirely at the mercy of the former.

MANUAL ARTS BUILDING, CONSTRUCTED BY STUDENT LABOR, NEEDLES, CALIFORNIA.

STUDENT LABOR

ROBERT A. CHESNUT.

THE time has come when it is not a problem to convince a board of education that the manual arts hold a very important place in any well planned scheme of education, but quite often it is difficult for the director to make clear the fact that the new department needs a good equipment and that that equipment should be as well housed as any other department of the school. The manner in which these problems were worked out in the little city of Needles, California, may be of interest to some.

In the fall of 1911 woodwork was introduced. Ten benches were placed in a small room 14′x20′. There was not room for lockers or lumber racks, but the lumber was stacked along the walls, and the partially finished and finished pieces were placed in the hallways or adjacent classrooms. Two exhibits were given during the year. Each one was of the nature of a reception to the parents and friends. Invitations were sent out and refreshments were served. A classroom was cleared and was then furnished with the completed pieces. Fig. 1 shows a part of one of the exhibits.

These exhibits created great interest among both pupils and parents. All-day sessions were held in the woodworking department every Saturday during the school year, and usually the little shop accomodated as many as twenty enthusiastic workers.

The boys had been very successful in repairing outbuildings, building fences, and doing general repair work about the school buildings. The board of trustees said the district would furnish the material if the students would put up the building the next fall. The boys very willingly agreed to this proposition, and the plans for a seven-room building

FIG. 1. EXHIBIT OF INDUSTRIAL ART WORK, NEEDLES, CALIFORNIA.

were drawn. The first floor consists of four rooms; a woodworking room 30′x37′; a lumber and locker room, 8′x30′; a finishing room, 8′x15′; and a kitchen 15′x30′; the second floor contains a sewing room, 15′x45′; a fitting room, 15′x15′; and a stockroom, 10′x45′.

It will not be necessary to describe every step in the erection of this building, for it is a typical frame structure, but it may be interesting to know how it was possible to keep busy as many as twenty boys at a time and how interest was held until all operations were completed.

As there was quicksand to deal with, the foundation was put in by contract. The floor joists and bridging went in slowly as only a few of the largest boys could attempt such work, and it demanded close supervision, but the sub-floor was laid in four hours. This was accomplished by group work. The class was divided into two groups, starting from opposite corners and working toward the middle. The teacher could easily supervise both groups. The work was divided among each

group as follows: four boys did the measuring and marking, four sawed, and two nailed.

The studs, ceiling joists, and rafters took several days, and were raised entirely by eighth grade and high school boys. The shingles were laid by the boys from the fifth grade and the high school inclusive. Here group work was used more extensively. In every class it was possible to find three or more boys who were unusually apt, and these boys were put in charge of small groups. The first course was laid to a line and after that a straight edge was used. The board was just the width the shingles were to be laid to the weather, and could easily be raised and tacked in place. This plan of working the boys in groups was used in putting on the sheathing, siding, floors, ceilings, paint, etc.

A large percentage of the boys never lost interest in any particular operation, but a few did, and it was necessary to resort to various means of arousing and retaining their interest. For instance, a record was kept of the number of boards laid by a certain class and posted in a conspicuous place so that the following class could plainly see what had been done. Invariably that class would work themselves to a point of exhaustion in making an effort to do more than the preceding class.

All the grounds were graded by the boys. One boy begged to wheel earth for three days after the grading was considered finished, just because one of his rivals in another class had succeeded in hauling more loads in a certain length of time than he had.

The inside finishing became rather tiresome as only a few were capable of doing such work, but when completed it was very satisfactory.

There were some hard problems to solve, and some discouraging results obtained, but as a whole it may well be considered as a great success. The equipment was installed during the fifth week of school, and even today the boys proudly tell the visitor that "we put this building up in five weeks."

FURNITURE DESIGN AND HIGH SCHOOL FURNITURE.

Robert C. Craig.

AMONG all the accessories to human living since the earliest civilization, furniture has probably been the most closely interwoven with the daily life of all classes of people.

Craftsmen have developed types suitable to the peculiar demands of the people and surroundings in nearly every country except our own. Here our designers and makers have spent their time either in turning out the greatest quantity at the lowest price regardless of artistic merit, or in copying "period" furniture. Space precludes comment on the former. Of the latter it may be said that, while a great many of the old types are admittedly beyond adverse criticism, the designs inevitably lose spontaneity and individuality by more or less incorrect and continued reproduction.

One can scarcely conceive of a more inspiring subject for the artistic and mechanical skill of the craftsman that the fashioning of beautifully grained and responsive woods into articles which make for comfort in the home and at the same time are truly decorative. A sound course in the basic principles of design (going further if possible) taught in our high schools would tend very greatly to raise the standard of our furniture by helping to eliminate the market for the travesties put forth by a great many of our factories. An article, to be cheap, need not be ugly.

We have had with us now for several years the so-called "Mission" furniture. As a reactionary type, it has served an admirable purpose by bringing into disrepute the exceedingly bad products of a decade or so ago. However this has been done thru "style" rather than education. The purpose of this new designing was, of course, to get back to good lines and good proportion and to the use of good construction. Since the lines are seldom other than straight, they could not well be very bad, and since the material used is so heavy and the joining simple, the construction presents no very difficult problem. The main faults in this type are its excessive weight and lack of refinement in detail.

By keeping before us at all times the need for good proportion and construction, its seems altogether possible that we should be able to lighten and refine this rather crude furniture into a type truly useful and beautiful. Our high school courses in furniture work offer an

excellent opportunity for the starting of a movement toward this desired end. For this reason every art or shop course should include furniture design and construction. The home is the center of interest for each of us, and we enter the trades or the professions in order to keep the home up to the best possible standard of comfort and appearance. Sooner or later, those who are now our students will be called upon to furnish homes of their own, and one of the chief things which we should teach them now is how to furnish those homes wisely and in good taste. Then they will know the reason for good furniture and will not accept poor work merely because it is "something new."

The heavy, straight-line pieces are being greatly overdone in our manual training work at present. Some high schools claim to be giving a course in furniture design, but it is a strange coincidence that produces, year after year, practically the same pieces from entirely different classes. Everywhere we see the same heavy table with the four square legs, a top, and a shelf underneath; the rigid, straight backed chair, and the board-legged taboret.

This monotony is no doubt due in some few cases to lack of time, but in many others one is led to the conclusion that it is indeed fortunate for the instructor that manual training and "mission" furniture appeared contemporaneously. In the first instance, a full year, ten periods per week, is the shortest possible time for a thoro course. In the second, whether or not the shop instructor teaches the design, a thoro training in this direction is just as necessary on his part, as is his knowledge of the constructive principles involved.

The ideal condition is that in which the instructor teaches the design as well as the construction of the pieces made in his shop; but if the designing must be done by a different teacher, he should have had experience in actual furniture making and should be able to visualize the finished piece from the drawing. I have known art teachers who were teaching furniture design to admit that they could not tell how a piece of work was going to look until they saw it completed in the shop—and the finished product often more than verified their statements.

ELEMENTS THAT WOULD ENRICH THE WORK.

There are several decorative elements which, if introduced into our high school furniture courses, would add greatly to the value and attractiveness of the pieces made. Simple carving, recessing, a bit of

turning, or modeling would help inestimably in adding individuality to, as well as in giving the student a greater interest in, his piece.

Steam bending is a simple process (requiring very little equipment which cannot be made in the shop) which can be used to great advantage at times. For instance, in a chair back it adds largely in making the chair more comfortable and less crude looking.

Art metalwork in connection with furniture making is another possibility which has so far been greatly neglected. Pieces of furniture are often all but spoiled by the hardware used upon them. This hardware, which the student gets at the store can, of course, have no connection whatever, either in form or coloring, with the design of the piece which he has executed. If the boy were taught to make his own fittings, hinges, drawer-pulls, etc., how much more attractive the finished piece would be, and, at the same time, how much more pride he would take in it, for then it would be entirely the work of his own brain and hand. This work does not require an expensive equipment, is not difficult for the student, and is easily learned by the teacher in case he is unfamiliar with it. If I may illustrate from my own experience, I introduced art metalwork into a high school furniture shop, where the classes averaged about fifteen boys each, at a total cost of $25 for equipment. This proved to be ample, and the result justified the amount expended many times over. It served an excellent purpose not only in keeping the classes together, by providing work for the fast boy, but also in more than doubling the attractiveness of the furniture made.

Of course, all of these mediums for adding to the beauty of school-made furniture may be greatly overdone; but this again is a strong argument for good training in design, for they are often over-done and also poorly done in the factory-made product.

At present it is customary to approach all shop courses from the vocational standpoint. Obviously, factory methods are impossible in a high school furniture course, for the reason that the pieces are all different, and one student does all the work on each piece. However, there is no better medium than a thoro course in furniture making for teaching a boy the proper use of hand tools, or machine tools, if they are part of the equipment. Therefore the work would be in harmony with the vocational motive, which is, after all, probably the most important one in our high school shop courses.

The avocational aspect of this question is seldom mentioned, and yet it is not altogether negligible. If a boy has a strong desire to do

constructive work but at the same time feels that he must enter a profession, there is nothing which will afford him greater pleasure in his after life than to fit up a small shop of his own and indulge his inclination for creating things for his home. He will be thankful many times that his school training has made this possible. His work will be good from both an artistic and a mechanical standpoint, and the doing of it will add wonderfully to his joy of living.

MADE BY A FIRST YEAR HIGH SCHOOL BOY,
TRENTON, NEW JERSEY.

ROOMS IN PAPER.
PROBLEMS IN CONSTRUCTION AND DESIGN[1]

IX.

NAMA A. LATHE AND ESTHER SZOLD.

SOME POSSIBILITIES IN PAPER FURNITURE.

Models built on the plan of those shown in Figs. 45A, 46A, and 47A can be successfully attempted only after practice on simpler models with coarser detail has developed some skill of hand and eye, or with well-trained adult students.

The designs in these figures show some of the finer possibilities of the problem. The curved forms are limited by the possibilities of good construction in wood, and by the necessity in paper construction for the angle-strength. Such dimensions as are shown on the patterns, see Fig. 45, Fig. 46, Fig. 47, indicate only the interrelation of parts. If one dimension is changed the related sections must be changed. The greatest values in this construction will come thru individual design, and the design here, as in real furniture, should be limited by the use, the material, and the construction of the piece to be designed. In the plates most of the dimensions which are chiefly or wholly governed by individual taste are omitted.

Modifications of these patterns may be used for many pieces of furniture. The bookcase, varied in proportion, would make a china cabinet. If the ends are to be of "glass" as the doors are, narrow horizontal rails to which the shelves may be pasted must form part of the pattern. A music cabinet is built on the same plan but with different proportions and a solid door.

To make a rocking chair from either of these chair patterns, cut rockers and add rocker-rails to the side sections of the frame by the method explained in the directions for the rocking chair.* Note, that to change this arm chair with arms turning outward into a rocking chair, that the rocker-rail must be cut half an inch or more back of the front leg allowing the rocker to be pasted on the outside of the back leg and

*(See June 1912, number, p. 441 and Fig. 22.)

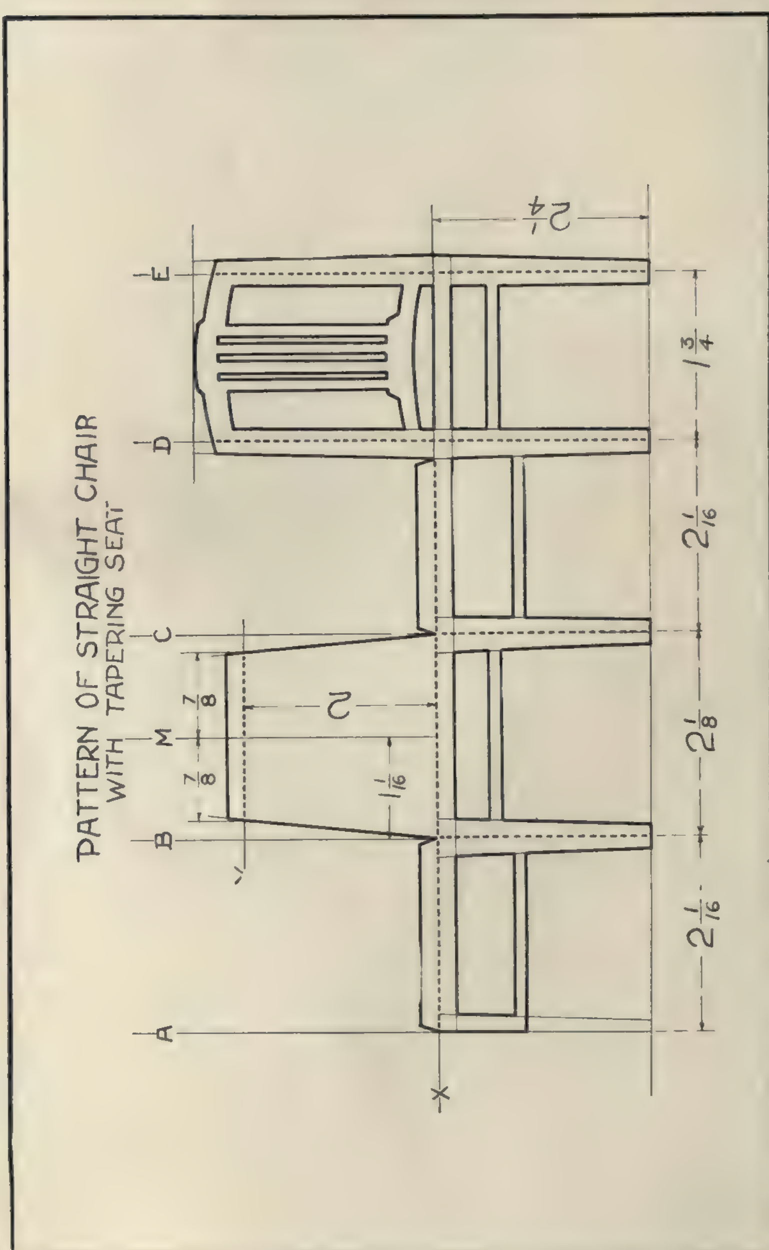

PATTERN OF STRAIGHT CHAIR
WITH TAPERING SEAT
A
B
M
C
D
E
X
7/8
7/8
1 1/16
2
2 1/4
2 1/16
2 1/8
2 1/16
1 3/4

FIG. 45.

the back portion of the rocker-rail, and on the inside of the front leg and the front portion of the rocker-rail.

A davenport with the arms turning outward may be made by varying the proportions of this arm-chair pattern as the other arm-chair was modified to make the other davenport pattern.* A davenport of this form might well have a rectangular seat.

STRAIGHT CHAIR WITH TAPERING SEAT.

See Fig. 45 and Fig. 45A.

Seat:—Begin drawing the pattern by planning the shape and dimensions of the seat.

Main Vertical Sections:—Erect the verticals B and C in their proper relation to the seat. The width of the sections between A and B and between B and C corresponds to the length of the sides of the seat. The width of the back of the seat determines the width between D and E.

Construction:—When these verticals are placed the order of construction and pasting are the same as in the simple straight chair.*

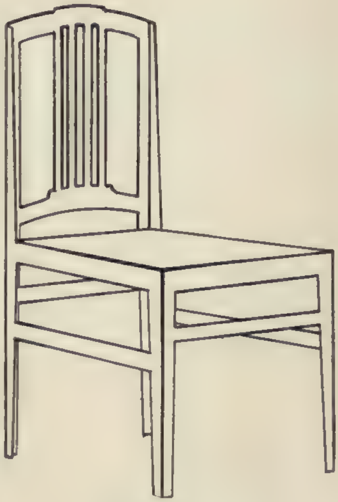


FIG. 45A.

ARM CHAIR WITH ARMS TURNING OUTWARD.

See Fig. 46 and Fig. 46A.

Seat:—Plan the shape and dimensions of the seat.

Front Seat-rail:—Add the horizontal strip beneath the seat-shape.

Front Leg-facing:—On both sides of the seat erect vertical strips of the shape and width desired for the front legs and extending above the seat line as high as the arms. See Fig. 46. If a second rung across the front is desired add it between these leg-facings and omit that much of the inner leg-facing which turns back against the inner side of the front legs.

*(See June, 1912, number, pp. 438-441.)

*(See Feb., 1912, number, p. 214.)

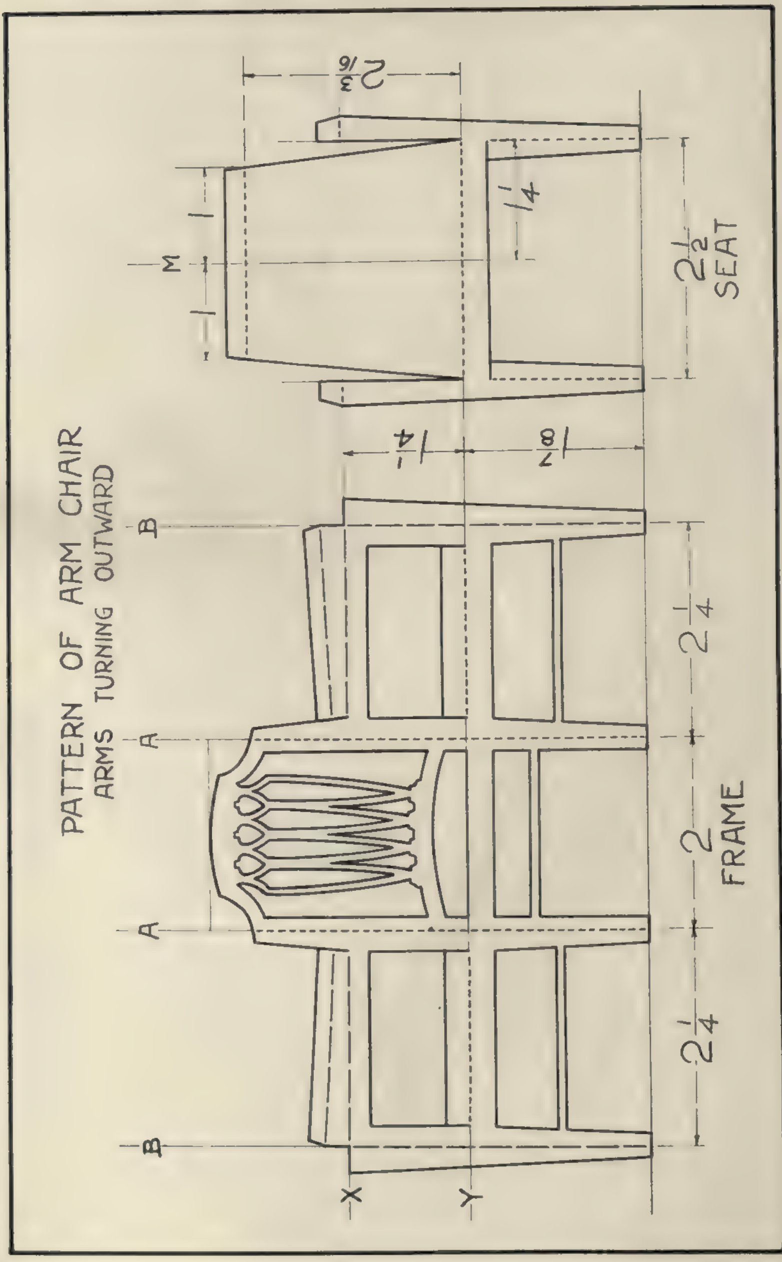

PATTERN OF ARM CHAIR
ARMS TURNING OUTWARD
A
B
X
Y
M
2 1/4
2
2 1/4
FRAME
2 1/2
SEAT
2 3/16
1 1/4
1 1/4
1 7/8
1
1

FIG. 46.

Frame:—Space the vertical sections of the frame to fit the back and sides of the seat.

Variable Details:—Complete the remaining details of the frame. The width of the arms may be equal to or greater than the width of the legs.

If, in the design of the frame, no waste for seat laps occurs along the seat-line, pasting-laps for the seat may be added along the sides of the seat pattern as far as the vertical leg-facings will permit.

Order of Pasting:—Stand up the chair frame and place the seat with the leg-facings in place noting how the parts fit. Paste the seat into place against the frame first.

Leg Facings:—Spread glue on the back of one leg-facing, press and dry in place around the outward turning leg. Repeat with the other leg.

Arms:—Paste the small laps at the top of the facing strips to the under surface of the outward-turning arms. Double the laps along the outer edge of the arms, against the under surface of the arms and paste in place.

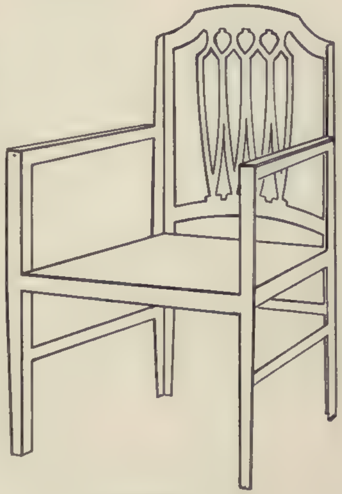


FIG. 46A.

BOOK CASE, WITH DOORS.

See Fig. 47 and Fig. 47A.

Design:—After the height and width of the book case have been decided upon, draw an oblong, outlining its front elevation. On this, sketch the pattern of the front of the book case showing the design of the doors and the placing of the shelves. The shelves should be indicated because it is necessary to consider their position in designing the doors.

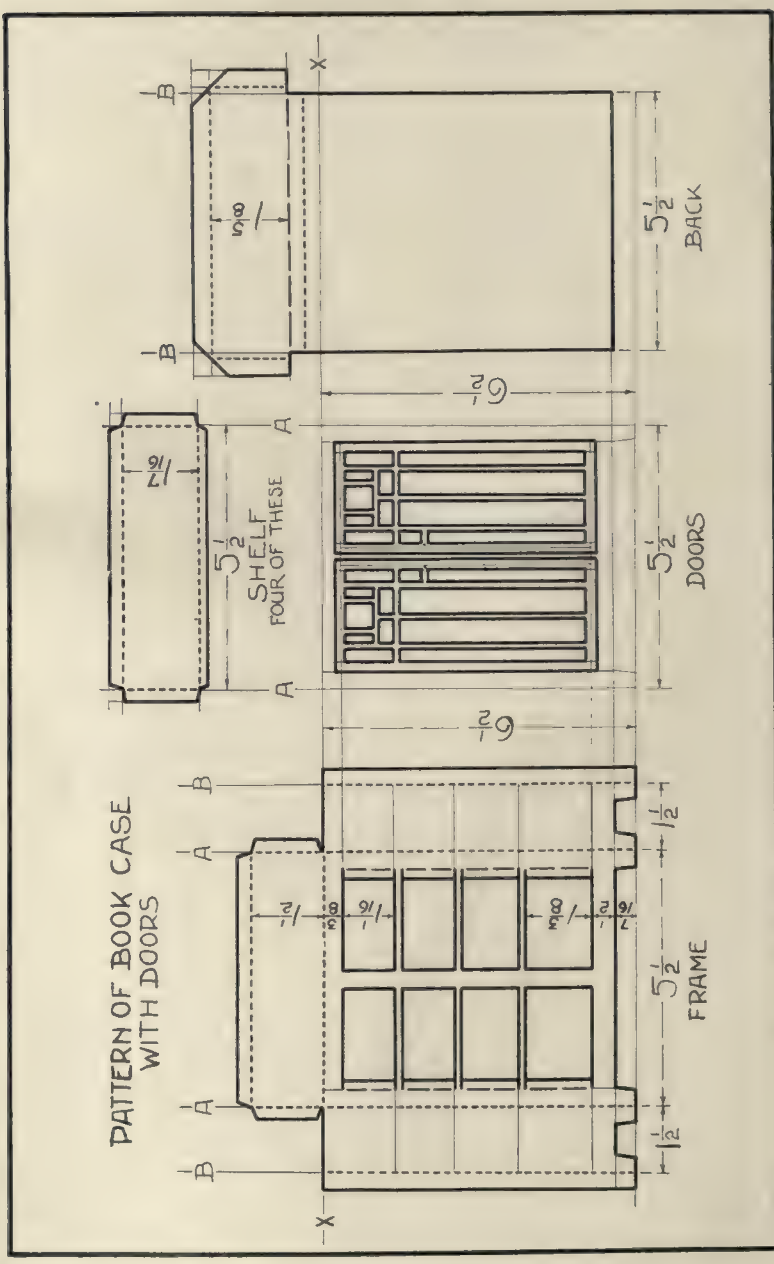

PATTERN OF BOOK CASE
WITH DOORS
SHELF
FOUR OF THESE
BACK
DOORS
FRAME
A
B
X
$5\frac{1}{2}$
$6\frac{1}{2}$
$1\frac{1}{2}$
$\frac{1}{8}$
$\frac{7}{16}$

FIG. 47.

Varying widths of spaces between the shelves suggest places for books of different sizes. Since the natural location for large and heavy books is near the base of the book case, these spaces are wider.

Calculation for Door Openings:—On the final drawing of the frame pattern the openings for the doors are made enough smaller than the doors to permit the latter to lap $\frac{1}{8}''$ over the surrounding framework.

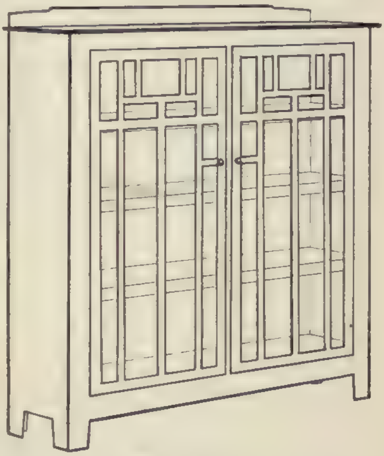


FIG. 47A.

On the hinge side the hinges can lap under the door to the width of the door-strip which pastes against them.

Doors:—Paste the doors on the hinges. See that any horizontal rails of the design fall in the proper relation to the shelves and door openings.

Shelves:—Paste the long narrow front laps of the shelves to the inner face of the front section of the frame along the strips provided for that purpose. An exact method for pasting has been described in the open book case.*

Projecting Top:—Fold the pattern for the back as indicated by the folding lines. Double under and paste the laps on the outer edges of the large top oblong.

Protection Rail:—Paste the strip just below this oblong against its neighboring section above line X.

Pasting Back and Top:—Fit the back to the frame with the projecting top resting on the top of the frame. Remove, spread glue on the laps at the backs of all the shelves. Paste the back in place.

Spread glue on the top of the frame. Paste the projecting top in place.

Final Details:—Shape the protection rail as described in the directions for the chiffonier.*

Use small brass paper fasteners for the door knobs.

*(See Feb., 1912, number, p. 222.)

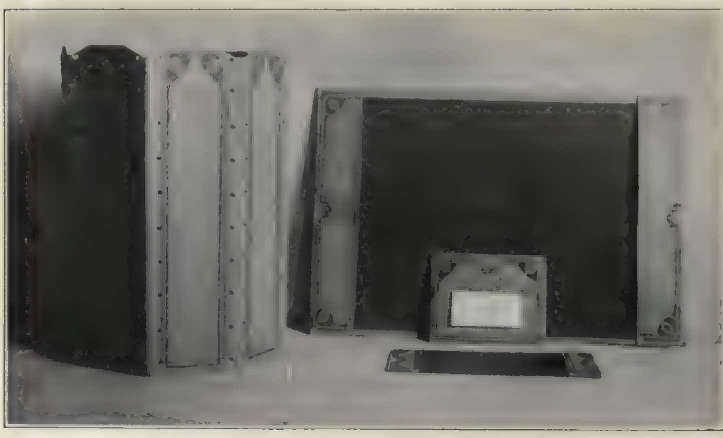
*(See Oct., 1913, number, p. 36.)

CONCLUSION.

Modifications of patterns such as suggested here may be made from most of the patterns shown thruout this series. It is partly because such variations may be readily made that we feel these patterns are of value. They give a rapid means of converting the idea into concrete form, of putting two-dimensioned design into its three-dimensioned form and relationship.

Thought of the home, its needs and its comforts is the motive; the model room with its beauty of proportions, colors, and forms, and its pleasing arrangement is the result; but that which remains long afterward is the understanding of form in the mind of the one who has constructed the form, and the vision of beauty in the heart of each one who has helped to create beauty.

(*The End.*)



FROM A MEMPHIS ELEMENTARY SCHOOL, E. E. UTTERBACH, SUPERVISOR.

EDITORIAL

EVERY few weeks the term "Manual Training" is given a thrust by some one who seems to believe that "manual training is dead and ought to be buried." We recognize some of the inconveniences in the use of the term "manual training" ourselves, but we like to see it given fair treatment. The noun training modified by the adjective manual in literal meaning does not convey the idea of manual training as understood by most people. These two words taken together and applied to handwork in education have always meant more then merely "establishing nervous connections between the sense organs and muscles"; tho we recognize that such connections are no insignificant part of it, and might even justify it. To imply that the common meaning of manual training disregards "content" is to ignore the practice of most manual training teachers during the past thirty years and to follow the wish of the theorist; it is to ignore also the fact that in spite of all the theoretical discussion manual training instruction has been voted into school systems year after year chiefly because the layman has recognized in it an industrial value. He voted for the thing he saw, not for the theory, and he would undoubtedly have voted the same way if it had been called by any other name. But at that time it was called manual training, and so the term "manual training" has been used, has spread, has become popular, has become richer in meaning just as many other terms in the English language have become popular and richer in meaning. Such growth is a matter concerning which theories of what ought to be have little to do. Even legislation has an up-hill road in changing the use of such a term, just as executive authority has in reforming a spelling which is generally sanctioned by "good use".

In these thrusts at manual training it is common to assert or imply that the psychology of the manual training teacher is out-of-date. While there is undoubtedly some ground for making such implications, it seems to us that by force of circumstances such teachers have been fully as progressive as teachers of other subjects, and that manual training teachers have not stood still while all the discussion of the past five years has been going on. On the contrary, they have been among the leaders in organizing vocational courses and in stimulating development in the practical arts. Our observation

indicates that representative work being done today under the name "industrial arts", or "practical arts", is almost identical in content and method with equally representative work under the name of manual training, and likewise identical with work done in other places under the name "manual arts." Any differences are chiefly in the minds of the promoters of the work, not in the work itself. In making this statement we are not forgetful of the fact that it is easy to find work labeled manual training that is over-systematized, organized to the point approaching the automatic of the factory, so that it stimulates too little thinking. It is also possible to find work labeled industrial arts that is still chaotic so far as pedagogy is concerned. It has not been organized at all either as handwork or machine work. To us it would seem reasonable that in years or generations to come one of the three terms in question may supercede the two others in educational terminology, tho that does not worry us now so much as does the character of the thing they stand for. We are not over-anxious to retain the term "manual training," and could be content with the term "industrial arts." At the present time our preference is for the term "manual arts." We believe (a) that it is more convenient to use, (b) that it provides a reasonable caption under which to classify school handwork, (c) that it arouses little opposition; (d) it has never been in disrepute, and (e) it provides the distinguishing word "manual" which seems to be needed.

Origin of Term "Manual Arts"

In this connection it may be of interest to many of our readers to note a few facts concerning the origin of the term "manual arts" as an educational term. On June 6, 1881, John S. Clark of Boston, delivered an address before the Philadelphia Board of Trade and the Franklin Institute on the subject "Industrial Education from a Business Standpoint." In speaking of the essential elements in Industrial Education he grouped them under three heads, (1) science, (2) art, (3) the manual arts. Under art, Mr. Clark placed "graphic and aesthetic art" which he considered threefold in its nature, relating to construction, representation, and decoration. Under the manual arts he placed the "knowledge of the fundamental manipulative processes in dealing with raw materials," such as bending, welding, punching, planing, splitting, sawing, turning, joining, and the like. This may not have been the first use of the term in that sense, but it is the first we have seen recorded.

Later Mr. Clark used the term in a similar way on different occasions, and in the minds of some who listened to him there was question whether he might not have included the graphic arts under the heading manual arts. In 1893 the trustees of the New York College for the Training of Teachers, now Teachers College, received the gift of $200,000 from Mrs. Josiah Macy, with which to construct a building for the departments of "form study and drawing" and "mechanic arts." When the question came up of selecting a name for the building that would appropriately comprehend the two departments the name "Macy Manual Arts Building" which the structure now bears, was decided upon. This decision brought the term "manual arts" into some prominence. In 1896 Dr. James P. Haney became supervisor of manual training in the public schools of New York City, and a little later when the drawing was also put under his supervision and practical working union of the two lines of work was established, he caused the new department to be named "manual arts" because, as he said not long ago, it "appeared as a more comprehensive term and one that permitted the including of all desirable subjects that psychologists dub 'motor.'"

In 1897 Bradley Polytechnic Institute opened with a department of Manual Arts which included drawing and design as well as work in wood and metals. In May 1901, the Council of Supervisors of Manual Arts was formed in New York City for the "advancement of the arts of drawing design and constructive work in public education." In February 1904, the Illinois Manual Arts Association was organized at a meeting held in Peoria, Illinois. Since 1905 the term "Manual Arts" has grown rapidly in popularity, and is still growing.

As stated before, the character of the thing, and not its name, ought to concern us most, but in our estimation the term "manual training" has an honorable record and the term "manual arts" has met a real and a growing need in educational terminology.

—C. A. Bennett.

Impossible Conditions In our October number we made a plea for a reasonable amount of time for manual training work, especially for woodworking in the 7th and 8th grades, and told of one city in which 390 different pupils were sent to one teacher of woodworking each week for instruction. This statement called forth several letters which revealed even worse conditions. In the December number we quoted from a letter in which the teacher told of having 525 pupils

registered in his classes at one time. We thought that this statement must be the limit of absurdity in failing to recognize necessary conditions for effective work in teaching manual training, but we were mistaken. We have since received from a teacher in one of the largest cities of the East a letter in which he says in part, "Just think! I, alone, teach (!!!???) eighteen classes from Monday morning until Friday afternoon, every class above 30 and some of them near forty, with 29 benches to use. * * * I know my boys by bench numbers only, like convicts!"

And some educators in that same city find fault because the manual training is not sufficiently vocational in character! From one point of view such conditions are "a joke, a parody and a drama." But they reveal low ideals, or lack of administrative ability, or a willingness to play at politics, or possibly they may be the result of plain ignorance. Whatever the cause the result is the same. It is so bad that we do not need to hunt for an excuse for it. There is none. That such conditions exist without there seeming to be any effort to remedy them is doing positive harm to the cause of handwork instruction in the schools. Two hundred pupils are enough for any teacher of shopwork and 2½ hours a week is the shortest time that should be given to shopwork if adequate returns are to come from the expenditure of public money.

From the opposite end of the continent comes an encouraging note. Pasadena, California is considering the dropping of shopwork from the 5th and 6th grades in order to give double time in the 7th and 8th grades. We say this is encouraging because we have long since reached the conclusion that it is far better educationally to have 3 hours of shopwork a week in the 7th and 8th grades than 1½ hours a week in the 5th, 6th, 7th and 8th grades. There is every reason why greater thoroness should be encouraged and in the case of shopwork such thoroness necessarily means more time to devote to the work. We would not wish to omit handwork from the 5th and 6th grades, but if the alternative were as above stated, 3 hours in the 7th and 8th grades or 1½ hours in grades 5th, 6th, 7th and 8th, we would take the former and be glad of the opportunity.

There is another reason for this decision. It is still an open question whether for most students woodworking is better for boys in the 5th and 6th grades than a well-organized course in cardboard work and book binding, which may be done at much less expense in the regular school room by the grade teachers under good supervision. Moreover, there

are other types of manual arts instruction which may be given in the 5th and 6th grades in the regular school room with marked success. We hope the developing need for pre-vocational instruction will stir up school authorities to make a readjustment of time, which will enable shopwork to become properly effective as a school subject. For general school purposes such instruction should occupy from 2½ to 3 hours a week; for distinctly pre-vocational classes it must occupy from two to four times as much time. In these days when so many questions are decided on a financial basis, it is not difficult to get the ear of the authorities when it can be proven that a good change will reduce cost of teaching force and equipment. This is the kind of a discovery that seems to have been made in Pasadena. —C. A. B.

When we published in our last issue the portrait and brief biographical sketch of Dr. Pabst of Leipsic we were hoping for his full recovery to health and many more years of active service, tho we knew he had been obliged to retire temporarily to a sanitarium. A letter from Frau Pabst dated February 22nd, states that in consequence of continued illness Dr. Pabst has been obliged to give up his office as director of the manual training college at Leipsic and that by the end of March he will move to Weimar. This removes from active service another of the few great leaders in manual training. He will be greatly missed because he has always been active and always progressive. The latter was made clear beyond all question when his magazine *Blatter fer Knabenhandarbeit* became *Die Arbeitsschule,* embracing all efforts to apply the principles of handwork instruction in education, whether for general or vocational ends, and thereby gaining the support of a large body of the educational leaders of Germany. We know we express the feeling of hundreds of Americans when we extend to Dr. Pabst our sympathy, and wish him many years of well-earned quiet and happy life.

Announcement of the prize winners in the "Competition" announced in the December and February numbers will be made in the June number. The judges have not yet completed their work.

ASSOCIATIONS

BOSTON MANUAL TRAINING CLUB.

The annual dinner of the Club was held on Saturday evening, December 20, 1913, at the Boston City Club, and was a most enjoyable occasion. The Committee is glad to be able to present abstracts of the addresses which were delivered at that time.

HARRY L. JONES,
Somerville, Mass.,
Chairman of Press Committee.

THE CURVE IN RELATION TO THE MANUAL ARTS.

Henry Turner Bailey, editor of "The School Arts Magazine" said, in discussing this topic:

My friends, it is a great pleasure to be here tonight. A man who has been invited to dinner and has partaken of the dinner, has no excuse when he is called upon to speak afterwards. The dinner has been a good one; I have noticed that everybody has enjoyed it quite as much as I have. Before I speak to you about my topic, I do want to congratulate this Club upon its membership. I remember the first manual training school in this state, and the first teacher of manual training—the only one at the time. Here tonight is this company of one hundred and fifty men. The cause for which you stand has been from the first a growing one. The thing that pleases me most, as a teacher of drawing, is to see here tonight, men who were trained first in drawing alongside men who began with the other side, handicraft. The two ultimately must be one, and the cities and towns in this state that have had the sense to put the drawing and the manual training under one head, so that the two large topics shall be thoroly interrelated into every department, have shown a wisdom beyond the time in which we live.

The topic upon which I am to speak to you tonight is a topic in which every teacher of manual training must be interested—must have an increasing interest—never mind why—perhaps we will come to that again.

I am going to begin by quoting a statement Colonel Parker made to me the last time I saw him. I happened to be in his own house sitting opposite him at dinner. He looked at me, put his fingers together, shut his eyes, then opened them suddenly and he said, "Mr. Bailey, you are a younger man than I. You will live to see all the courses of study in the schools of this country reorganized on the basis of the arts." I thought, at the time, he was saying something he thought complimentary to my profession, that he was saying something he really did not mean, but I know now that he did mean it, and I know that his prophecy is being fulfilled. I wish I had the letter with me that I received yesterday from Dr. Bonser, of Columbia, with his comment on the University, and what the University has got to do in relation to this widespreading movement which is emphasizing the arts in education.

However, I must get at my topic. The topic is "The Curve in Relation to Manual Art."

There are two fundamental kinds of curves. These two fundamental kinds may be represented one by the arc of a circle and the other by a line like this. (See accompanying sketch.) Now the arc of a circle is a line controlled by a center. If a curve has a 6-inch radius, you know it is possible to compute the length of the life of that curve. It is 3.1459+ you know, times the diameter. That curve, therefore, returns upon itself after a run of about a meter. For that reason, it has been called by Ruskin a "finite curve" because knowing one part of the arc, it is possible, as you know by a problem in geometry, to determine its center and the length of its life. Moreover, you know that if an arc of a circle be cut into parts of equal length—let us say 4 inches—that each part has precisely the same curvature as that next to it; therefore, the curve of a circle is a monotonous curve, a finite, monotonous curve. Every part of that curve is evidently predetermined by a center. Anything which has any art in it expresses freedom in some way. There is no freedom expressed in the arc of a circle.

1. A circular arc. Finite, monotonous, with no freedom of movement.
2. A straight line, equally necessitated.
3. A free infinite, varied curve, apparently controlled only from within.
4. The basis of law beneath an infinite curve.
5. Two curves of 3 making a reversed curve.
6. The logical termination of 3 and 4. The spiral.
7. Two curves like 3 and 4 combined to produce Hogarth's "Line of Beauty."

Now this other curve is quite different. Let us consider its structure. If we were to draw here a line—let us say, to make it definite, 7⅞ inches in length; and if we were to make here an angle, let us say 179½°—again to make it definite—and then if I were to make the length of this second line four-fifths of the first (you need not try to figure that out!) and if I were to proceed maintaining the same angle, 179½°, and the same ratio, four-fifths of the preceeding line, going on and on, you begin to see what we would get. We are constantly approaching a point. You see that theoretically this process is limitless in both directions. Now if I draw a curve passing thru these points, you see we have a curve like that first drawn freehand. That curve, theoretically, is unlimited in both directions. Ruskin calls it an "Infinite" curve; knowing any part of it, you cannot predict the length of its life. You see also that if this curve were cut into pieces 4 inches long, no two of these pieces would have the same curvature. Every part of that curve 4″ in length is different from every other part. That curve expresses a freedom It appears to bend of its own will, from within. It shows no constraint from without; controlled by law it appears perfectly free. The old problem of fate and free will is here solved. This infinite curve—a curve expressing freedom

—is the other type of curve to be set over against that circular curve. Let us consider the functions of the two types of curves: first the nature and then the arts.

First, nature. Here is a section of an onion sliced across. The different parts are grouped around the central core and the lines which define them are practically circular curves. That onion, in side view, however, does not present the curves of a circle. The curves of a circle are to be found only in the horizontal section. The side view shows curves of the other type; everyone is related to that finite curve, either in its simplest form or doubled upon itself to make what is known as a reversed curve, or curve of grace.

Suppose we substitute for our onion, the bulb of a hyacinth. Put that into a glass of water. What takes place? Life begins to manifest itself. That life is free. It expresses itself in lines of freedom and the first curve of the first leaf and every other line that comes out of it takes the path of an infinite curve. When the hyacinth blooms you know what takes place. Every little flower that comes is made up of these refined infinite curves—not circular. You will find that the section of the grass stem is circular, that the trunk of a tree is circular in section, and that thruout nature every bud, every flower, every cross-section is circular, or has some form derived from the circular. Nature uses the circle for structural purposes in plan or where equal subdivision of work or distribution of stress is desirable. But the moment you come to the elevation of anything in nature—manifestation of aspiring life—that moment all your circles disappear and you find only the infinite curves. Let me give you two or three illustrations. (Mr. Bailey here drew goldenrod, violet, ferns, lilies, insects, birds, animal, etc., to prove this point.)

Look at your own body. Take contours of the muscles; infinite curves everywhere, not the arcs of circles. Observe the ends of your fingers. Open your hands. Look at them. Where do you see the arc of a circle. Well now those infinite curves are the curves not only which give beauty to everything in nature, but those are curves which have given beauty to everything in art in every period, and always will.

For instance when the old Egyptians made the most beautiful and typical capitals the Lotus Bud, there are your curves; here is your stem. When they made that capital they simply used these curves of force. (Mr. Bailey here reviewed by rapid drawings the history of these types of capital, thru the six historic schools of architecture, and sketched typical Egyptian, Greek, and Medieval utensils to show the presence in them all of the infinite curves).

You have got to train your boys so that they know a good curve when they see it, and so that they can produce a curve of good character. You can not possibly sell a pair of shoes, if your sample was like this (making outline on board). Could you? You know perfectly well that when they bring out their samples they work on these lines. (Drawing). It makes very little difference whether a shoe fits them or not. Nothing will sell in the long run unless it has fine design. It is coming to be more true every year that the man who can produce the fine thing is the man who gets the money. A statement was made to me recently by a big manufacturer that the cheap things that are made for the people now have to be made with fine lines, tho produced by machinery.

I could name a man known to all of you here tonight who once said in print that all the art education Massachusetts has given in the last 40 years has produced nothing except a negligible result!

I said to a wall paper man in Boston, not long ago, "Can you see that the instruction of design in Massachusetts schools has had an effect?" "Yes sir," he replied. "In what way?" I asked. "We can still sell anything to the rich," he said, "provided it is imported or is sufficiently expensive, or is the fad; but we cannot palm off the poor truck on the common people any more because they bring their children with them to the store and the children know what is good."

Nothing in Massachusetts out of 40 years drawing of the handicraft except a negligible result? Is that so? It seems to me that in 40 years our architecture has improved; it seems to me that our school furniture has improved. Our silverware has improved; our newspapers are better than they used to be in design. I am sure if you could make a visit to the homes of the common people in this state you would find better wall paper and better rugs and better ornaments of every sort. How did they come by these things? If you think that the art and manual training teachers have had nothing to do with it, you assume that all education means nothing. The whole system of public education is wrong if you can produce nothing with 40 years of teaching but "a negligible result." No, my friends, you men know that art and craft instruction has meant something and that it must mean more. And I want you to see tonight that the time has come when you must give up your old mechanical design where every curve is the arc of a circle with a prescribed radius, and pass on to the higher and finer design that smacks of good taste, that presents the refind contours always found in the finest handicraft. The human spirit, itself infinite in its aspirations, will never be satisfied with anything short of infinite beauty.

I want in closing to make a plea for manual art as a cultural study. I want you to see that your department holds within itself the means of culture for your boys and girls. These manufacturers who are advocating industrial training, greater industrial efficiency, prevocational work and all that sort of thing, do not want *real* education of the boys and girls of America. They simple want to get hold of more efficient workers for their commercial systems. They openly say that they want those who are more skilled with their fingers so that they can turn out more dollars. I want you men to understand that these manufacturers who are anxious about this matter of industrial education will not secure what they hope to secure—their supremacy in the commercial world—by getting hold of boys and girls sooner in life to work their machines. They will be disappointed. With the best intention, they will be disappointed. You can produce fine products only when you have fine workmen. You have got to have workmen of cultivated taste and it is for you men, who are interested in the training of boys from the educational side, to hold on to these boys and girls as long as you can and to give them all the cultivation you can by means of your handicrafts. When you stop to think of it, what a tremendous reservoir of culture has never been tapped by manual training. When did you ever hear manual training men say anything about the great master craftsmen of the world?

When did you or your boys in carpentry learn anything about the royal carpenters to the Pharaohs whose proud memorials have been freed from the sands of Egypt? Go thru the whole history of craft—in Greece, Rome, and the middle ages. When did your students ever hear of the men who have filled Europe with beautiful towns and cathedrals, and stocked its countless museums with beautiful objects we Americans pay $50,000,000 a year to go to look at? Oh there is a vast wealth of culture waiting for you men to bring to your boys and girls. The greatest misfortune that can come to the *ignorant* working man is leisure. He flies to drink—he flies to every sort of dissipation that incapacitates him from his work. He does not know what to do with his time. The most important thing you can do for a workingman is to give him home inspiration that will make his leisure hours precious to him. Give the workingman an interest in anything outside the mere mechanism of his work—an interest in biography, history, the history of his own craft, in music, in design, an interest in raising flowers, I do not care what it is—give him an interest that will absorb his attention the moment he is away from his bench or machine and you will make him a better man. He will live better, he will grow better as long as he lives. It is always the man behind the gun—the man behind the machine—the man of taste and cultivation who will produce the fine thing. A manufacturing man, in the hardware business, once said to me "We have the greatest difficulty in getting men who can run our polishing machines satisfactorily." He was referring to cast work for door plates. "We have skilled designers who can produce fine ornaments, we can get the ornament cast all right, but these polishers who know nothing about curvature and fine modeling are sure to spoil the plates because they do not know enough to know when to stop polishing. They polish our finest effects into the dust heap."

A big manufacturing jeweler once told me he could not produce the finest grades of jewelry because his workmen "could not make a perfect spiral even with a perfect copy before him!" We have got to have workmen with eyes trained to see and hands trained to obey. We have got to produce for our manufacturers, if they are to have their share of the business in the markets of the world—we have got to produce for them something besides mechanics—something besides human machines. We have got to produce cultivated men.

Your boys ought to come out from the manual training shops with eyes for the beauty of nature primarily, and then eyes for the beauty of fine arts. All fine things in art are human interpretations of fine things in nature. Your boys ought to make sketches from buds, leaves, flowers, seed pods, everything with beautiful curves. They ought to be trained to find in all these, hints for the designing of beautiful objects.

You manual training men have a boundless opportunity before you.

God has made nothing common or unclean. When your eyes are opened to nature you will find in everything lines of beauty which transmitted in the work of your hands, will make your work precious to the human spirit. If there is one prayer that manual training men ought to pray it is the prayer of Moses the Man of God, in the 90th Psalm. "Let thy work appear unto thy servants and thy glory unto their children and let the beauty of the Lord our God be upon us; and establish thou the work of our hands upon us; yea, the work of our hands establish thou it."

They have preserved in the museum of Europe the work of masters' hands because something of the infinite beauty of the works of the Lord our God is upon them. When we learn more about beauty we will talk less about the mechanical side of industrial training. That will take care of itself. We will hear more talk about the esthetic side of industrial training. When we can lead boys and girls to live a large and abundant life, then will they produce the kind of art that will hold the markets of the world, because it will be worth buying. There are three absolutely ineradicable hungers of the human spirit: hunger for truth; hunger for goodness; and hunger for beauty. You can not afford to ignore any one of them. The human spirit cannot exist without law; it cannot grow without religion; it cannot be happy without art.

THE FUNCTION OF VOCATIONAL GUIDANCE.

Speaking on this topic, Meyer Bloomfield, director of the Boston Vocation Bureau, said in part:

I wish that Mr. Bailey had left his circle and the curve of force on the blackboard because these two figures illustrate very much the whole conflict in our educational conceptions of the child today. The vocational guidance movement asks that we view the child as that curve of force, as that human being of infinite possibility, as that human being of every possibility, and that we view the educator as a person who enables that child to find itself; to discover itself in the process of schooling.

I will not take the time to go into the history of the courses in our schools. Every course of study, every subject, is the result first of somebody's vision or somebody's dreams, and in the second place, the result of some organized agitation, and in the third place, a process of forgetfulness and routine.

No scheme which deals with human nature can long remain vital if it forgets its original excuses for being. Drawing, of course, is an old subject in Massachusetts, if we can call anything old here. A little later mechanical drawing came. Then manual training was suggested. Now like many movements in education or in social life, a number of forces were at work and are at work to alter the original ideas.

I wish to correct the chairman in saying vocational guidance is new. It is not new. Its organized form is perhaps new, but vocational influence is one of the ancient services. Manual training was agitated by the same forces which are behind the movement for vocational and educational guidance. Some manufacturers, some business men, were very active in urging manual training as some manufacturers are interested in urging vocational or perhaps industrial education, but the largest excuses and motive for manual training did not come from manufacturers, any more than it comes today in vocational education from the side of industry. It came from humanitarians. It came from those who wanted to give children a chance. It came from those who saw that many children could not possibly realize themselves under the older forms of schools, and furthermore, they saw that education for the most part must be meaningless to the masses who find no relation between what they learn during their few years of schooling and what they must know and possess during the largest portion of their lives.

Now it is a great tragedy in our social life that we think and have permitted education to be one thing and work another. And when we fear the vocational movement, when we fear the introduction of work motives in a school, it is because we have now acquired that stagnant routine of separating the sources of everyday livelihood from the scheme of educators.

How can we ever make work yield any educational values? How can we make working life mean any more than wages if we permit that sort of thing in this country? We do great damage to our entire social structure in not seeing to it that the greatest task for every educator, particularly those whose work brings them close to the livelihood sources of people, is to see how far we can connect work with school. If work is not fit to be connected with the school then we must find a way to make the work fit, because school must influence industry quite as much as we think industry has influenced the school. After all if manufacturers will not cater to the schools, we shall do no better than we did when business invaded our commercial departments in the early days when business training was started in the schools.

This is the way this problem has been faced by Germany. These people, with their passion for efficiency, are studying one of the most remarkable things in the world. They are studying how to make any kind of occupation yield some kind of educational return. What is its intellectual content? What is the development content of the occupation of a chimney sweeper? Shall a messenger boy be a degraded being as he is in this country, or shall messenger boys represent a form of social service. The people in Berlin are meeting this problem for the messenger boy. We should be met with ridicule in this country if we were to announce today that we are prepared to give a short course for messenger boy service. We have given him a bad name. That is characteristic of the ugliness which Mr. Bailey has described. That is the ugliness we associate with work.

I remember that in Worcester three years ago there was a hearing by a local commission on industrial education. A workman spoke. He wanted a very fine industrial school erected. He was opposed to having the city rent a brick building, fitting it up with used machines, and making the whole place look grimy and realistic. One of the members of the Commission asked "If you have such a school as you propose here, when these boys leave that school and go into factories in this city and find them different, they will be discontented." "That is the reason why I urge a school such as I have described," the workman answered.

A little over a year ago, I went on a tour of Indian schools for the Department of the Interior, and in the northwest corner of the State of Washington we came to the main street of a town where there was a local election going on. We saw a banner across the street. This is what that banner contained (I think the man was running for the office of coroner): "Vote for John Smith, the people's friend. Vote for the man who gave you your morgue."

Many issues are still of that type. And unless the children are helped by the educational forces to find themselves in the work, most of them do not. And that is what has brought vocational guidance to the front. We want the children to remain in school as long as possible. Therefore, the problem, how

shall we keep them? Not by compulsory school laws, because that is a kind of imprisonment to many a child. How shall we keep them? By interesting them. What interests them? Things that they connect with their impulses to share the surging life of the day. No child escapes the appeal of these forces. We must reckon with them—must respect and utilize them.

I have always thought that the manual training people have an enormous function in this field of vocational guidance. If it were possible to make the vocational counsellors of our school system the manual training people, I should think we were approaching the work wisely, because when you are given proper opportunity whereby children may discover what their capacities really are, your judgment in a consultation of what that child is best prepared for would be of infinitely greater value than the judgment of any other sort of instructors.

Our average classroom test is not the test which is represented in the life experience of the children. You may have your tests, and some day there will probably be a system of records developed whereby you will record not only your opinions—that is what the classroom usually records—but your observations. You will make a scientific study of little natures which are struggling to find themselves, and when you find significant clues, that knowledge of industry which is growing and is becoming organized, will be connected with your discoveries. Today we are guessing. We are not having vocational guidance in our average schools, but vocational misguidance. I have sometimes asked the graduating classes of schools in different cities to write what they are going to be and why? You never find out what children are going to be from these compositions, but you always find out what the teacher is—what the school is—what are the biases, prejudices, and traditions of the community, because these children reflect these things. We are living in a day when the layman, old or young, cannot possibly form an accurate judgment as to the occupations.

A year ago I made a visit to a Rochester clothing factory where I saw a coat made by 38 different persons—a man's coat. A readymade coat was subject to 38 specializations—pocket-makers, sleeve-makers, button-makers, basters, and what not. In a new bulletin on the clothing industry there are specified 48 different operations, and mention is made of a factory where 62 different persons worked on a coat.

We know how in Massachusetts the shoemaking, woodworking, and other industries have become enormously subdivided. Where is the child to get an all-round view and preparation?

The manual training people must tell us how to observe children's capacities. We cannot guess nor can we do much with a child who comes to us for a temporary bit of guidance. There must be continuous, consecutive study based on shop experience.

Next month Superintendent Dyer will reorganize the vocational guidance work of the Boston schools. He intends to create a department with special workers in charge. His idea is to connect the vocational guidance work with the continuation school work. Even then we shall fall far short of what we need to do. Within a year Dr. Kerschensteiner found it necessary to introduce another year in the elementary school, before the child could go to work—a year devoted to self-discovering purposes—a prevocational year. This prevoca-

tional year will act as a logical feeder to the continuation school. We look for manual training men who interpret school in terms of livelihood—in terms of motive—not only in terms of routine—in terms of tradition. The manual training people can give a scientific foundation to this vocational guidance work; if they do not, their work and the work of vocational guidance will not have a solid foundation.

VOCATIONAL EDUCATION.

This subject was discussed by Robert O. Small, Deputy Commissioner of Education for Massachusetts.

In coming before you this evening, I am reminded of the story Miss Gladys Ravenscroft, the English champion lady golfer, tells regarding herself. She says, "When I was first learning the game of golf, I had as a caddy, an old Scotchman by the name of Saunders. After I had been playing for about six months I said, 'Well, Saunders, how am I getting on?;' and Saunders replied, 'Yer no makin' a fool o' yerself, but ye'll never be a gowfer.'" My prayer in coming into the position which I now occupy, and in my attempt to guide this movement for vocational education, might be as follows: "That I may not make a fool of myself" while I am trying to qualify in the judgment of the people who are criticizing me and who are judging me as deputy commissioner in charge of vocational education. I approach this field with a good deal of humility, and I shall need all the cooperation I can get. But I am encouraged by this gathering under the auspices of the Manual Training Club of Boston. This is "right nice" of you people to ask me to come here to speak to you this evening. It is with great satisfaction that, looking into your faces, I see some assembled here who are engaged definitely in the field of industrial education; those who are engaged their entire time in teaching trades to minors. Associated with them I see those who are engaged in teaching art to youngsters. This is very significant. Extremes meet here and the exponents sit down together agreed that, after all, whether education is cultural, social, or vocational is determined by the aim more than by the content. I can conceive a situation where in content practically the same education is given, but the aim is that of culture or social improvement, in turn it is prevocational, and still again it is vocational.

I am satisfied that when we get together and agree upon definitions, and decide upon what our aim is, we will find less cause for quarreling. We have not quarreled much anyway, but we have been somewhat confused in regard to content, when after all it is the aim which makes the education social, cultural, or vocational. This is, at least, my interpretation of the situation.

There is a great deal of confusion regarding industrial education. If you listen to the various usages to which the term is put you will be keenly alive to the fact that there is much confusion. Only the other day I read of a teacher, one of those sweet creatures recently graduated from a normal school. Esthetic of taste, moved by a desire to bring her school closely in contact with this latest movement, and to industrialize her work, she visited some of the industrial plants and among them a locomotive boiler shop. She asked her guide, "What is that large thing over there? I never saw one of those things before." The

guide replied, "That is an engine boiler." "Oh, is that an engine boiler? Why do you know, I never knew that they boiled engines." The guide, while taken back, rose to the occasion and when she came with her next question, "Why do they boil engines?" he replied, "I do not know, I am sure, unless it is to make the engine tender."

In discussing industrial education, terminology is as confused as were the facts in the instance I have mentioned. Within two weeks I was discussing the subject of vocational and industrial education with some leaders in the movement not from this commonwealth, and I was told of a superintendent of schools who said he had succeeded in systematically vocationalizing his school program from the second grade up. He was asked what he put in for the second grade in the way of industrial education. He told about this scheme. He had the children of Grade II make sleds from cardboard. The sleds they made were three inches long and he had systematized the program in the other grades by having the children make more sleds. As they proceeded from the second grade they made the sleds one inch longer in each grade. That is not fiction, gentlemen. It was told to me as a fact. You will agree with me that we should get together on some terminology and some definitions before we have any serious falling-out in regard to these subjects which we are teaching; then we will not have these misunderstandings, because it is to a very large degree a matter of definition.

We who are interested in industrial education are using the term to mean that type of education which has for its aim the qualifying and fitting of a boy or girl to go into industry and earn a living wage. If we are honest about it, and that is our aim, what other way can we go about finding a boy or girl for an occupation than by putting them into training for a real industry.

Give the boys and girls a part of all that Mr. Bailey has told you about. We all know that as they leave school now and go into industries they have little chance to get it. The only opportunity for us to fit out these boys with any of that wealth is thru continuation schools, thru vocational education supplemented by some of that education which Mr. Bailey spoke to you about. We want them to have it. There is nobody seriously engaged in this business of vocational education who feels any other way, so far as I have become acquainted with them. If you find anyone who does "line up" in disregard for related work he is out to exploit the boy or girl. He does not belong in our camp. He is lost.

I am aware of the fact that there has been more difference between the advocates of the established traditional type of education and those who champion the cause of industrial education than there should have been. My contention tonight is that this is unnecessary; that there should be none of it. A committee—I think there is a committee of this Manual Training Club which is now at work on a report—will discharge a great responsibility and perform a great service if it can formulate an authoritative statement of the purposes and the aims of manual training and their relations to industrial education. I do not know that this is what their report is upon, but they certainly have a great opportunity to agree upon some facts and terms which will correct some of the misunderstandings.

I have not the method of attack that the advocates of some systems have.

My method of "shooting" at things is somewhat different; I find it absolutely necessary to have a mark and good aim before I can attempt to make a bull's-eye. I cannot shoot until I get my object before me. Neither can I do any successful teaching until I get my problem before me, until I get my aim pretty well defined. When that has been done, as I have said earlier, I am inclined to think that the aim counts more than the content. I think it is necessary for us in manual training or industrial education to get our problem definitely before us before we undertake to solve it.

I have defined industrial education. I should define prevocational education as that type of education which has for its aim the giving to pupils an opportunity to participate in many types of industries, to find if possible, thru a type of vocational guidance, where they can succeed. In industrial education the aim is to give a training for the industry; in prevocational education the aim is to give information and intelligence about many industries. In any given industry, at a certain stage of the training, the content might be much the same in both the industrial and the prevocational school, while the aim differed. This difference in aim determines the school.

Until we get more clear thinking along these lines, until we mutually understand our problem and what we are trying to do, until we agree upon certain definitions of terms, I fear that our logic at different times and in many deductions will be much like the logic of the man who went down the street, saw a stove advertised which would save half the fuel, and bought two of them, because "If one stove will save half of it, two will save all of it." We do not want this kind of logic in deductions regarding manual training and industrial education. Let us get our definitions and our terminology straightened out and we will have less of it. But I am reminded of that additional beatitude, "Blessed is the man who speaks and sits down, for he may be asked to speak again."

I wish to leave with you this suggestion as a final suggestion, "We must pull together." I do not mean you are to do my job, I do not mean you are to agree with me or I with you all the time, but we must pull together and help solve and work out this problem.

If you enjoy Kipling you probably remember this jungle rhyme. It fits our situation.

"Now this is the law of the Jungle, as old and as true as the sky,
And the wolf that shall keep it may prosper, but the wolf that shall break it must die.
As the creeper that circles the tree trunk, so the law runneth forward and back;
For the strength of the pack is the wolf, and the strength of the wolf is the pack.
I am the wolf and you are the wolf, and we all are the pack."

THE COLLEGE ART ASSOCIATION.

The third annual meeting of the College Art Association of America was held in the assembly room of the Harper Memorial Library at the University of Chicago on the twenty-ninth and thirtieth of December, 1913.

This organization of college art teachers, now in its fourth year, represents

thru its membership, over fifty of the leading colleges and universities of the United States. The purpose of the organization is to promote and standardize efficient instruction in the fine arts in the American institutions of higher education.

The opening address of the president of the Association, Professor Holmes Smith of Washington University, emphasized the necessity of placing the study of the fine arts on a par with other college subjects, and suggested definite methods of proceedure for the organization to this end.

Professor F. B. Tarbell of the University of Chicago, presented evidence in Greek sculpture of the free and direct attack on the marble without the modeled lay figure in clay or plaster from which the finished marble is reproduced by mechanical process in more recent sculpture. His argument was supported by reference to the slight variety in similar forms; by the absence of marks, suggesting mechanical reproduction in unfinished pieces; by tendencies to compose figures out of pieces of marble, rather than in one piece; by the avoidance of division in the marble thru conspicuous parts of the sculpture; and by the different depths of background given to different parts of the same frieze, suggesting that no finished model was prepared before the attack upon the stone.

The subject "Fine Arts as a Requirement for the A. B. Degree" was well presented by Professor A. V. Churchill of Smith College. Professor Churchill's assertion that "history has been rewritten on the evidence of fine arts yet undiscovered" was argument for the necessity of a study of these arts by those who presume to know and understand cultural development.

A paper on the subject "The Teaching of Arts in the College," by Professor O. S. Tonks of Vassar College, in which it was asserted that technical work in drawing, painting, and modeling had no place in the college course, aroused much discussion. It was evident from this discussion that a majority of those present favored technical work as a laboratory process, supplementing the study of theory, history, and philosophy of esthetics.

Professor Arthur Pope of Harvard University, gave a detailed and illustrated presentation of "Drawing and Painting in College Courses," as developed at Harvard. The purpose of these courses was emphasized as cultural rather than professional and as comparable to methods of teaching English composition.

The reports of two important committees of the Association were referred back for further investigation: one on "Investigation of the Condition of Art Instruction in Colleges and Universities," Professor Allen Marquand, chairman, and one on "College Art Courses," Professor G. H. Chase, chairman.

The Association voted to affiliate with the American Federation of Arts. Professor Sargeant of Chicago University, was elected President of the Association for the coming year, and Miss Cushman of Chicago University, was elected Secretary-Treasurer.

The membership has been doubled during the past year, and the Association has become a factor among the organizations of the country for the promotion of esthetical study.

EDWARD J. LAKE,
University of Illinois, Urbana.

SHOP PROBLEMS

George A. Seaton, Editor.

At the request of the editors of The Manual Training Magazine the following suggestions for the Shop Problems Department are contributed by the School of Practical Arts, Teachers College, Columbia University, New York, N. Y. The air compressor, as described, was designed and built by students during 1913 and 1914. The following Departments cooperated: Mechanical Drafting and Machine Design, under the direction of Professor Weick; Pattern-Making, Professor Noyes and Mr. Constantine; Foundry and Forge-Shop, Professor Sleffel; and Machine-Shop, Mr. Walsh.

FIG. 5. PATTERNS FOR AIR COMPRESSOR.

This machine was designed with two objects in view: one was the making of something of practical value; the other the application of mathematics and shop principles.

F. G. Bonser, Director.
School of Practical Arts,
Teachers College, New York.

AIR COMPRESSOR.

After the drawings (Figs. 1, 2, 3, 4) were completed in the drafting departments, blueprints were made, and sent to the pattern shop where the patterns for the base, cylinders, cylinder-head, piston, and main bearing caps were turned out.

The first pattern to be made was the base which is a "shell" pattern that

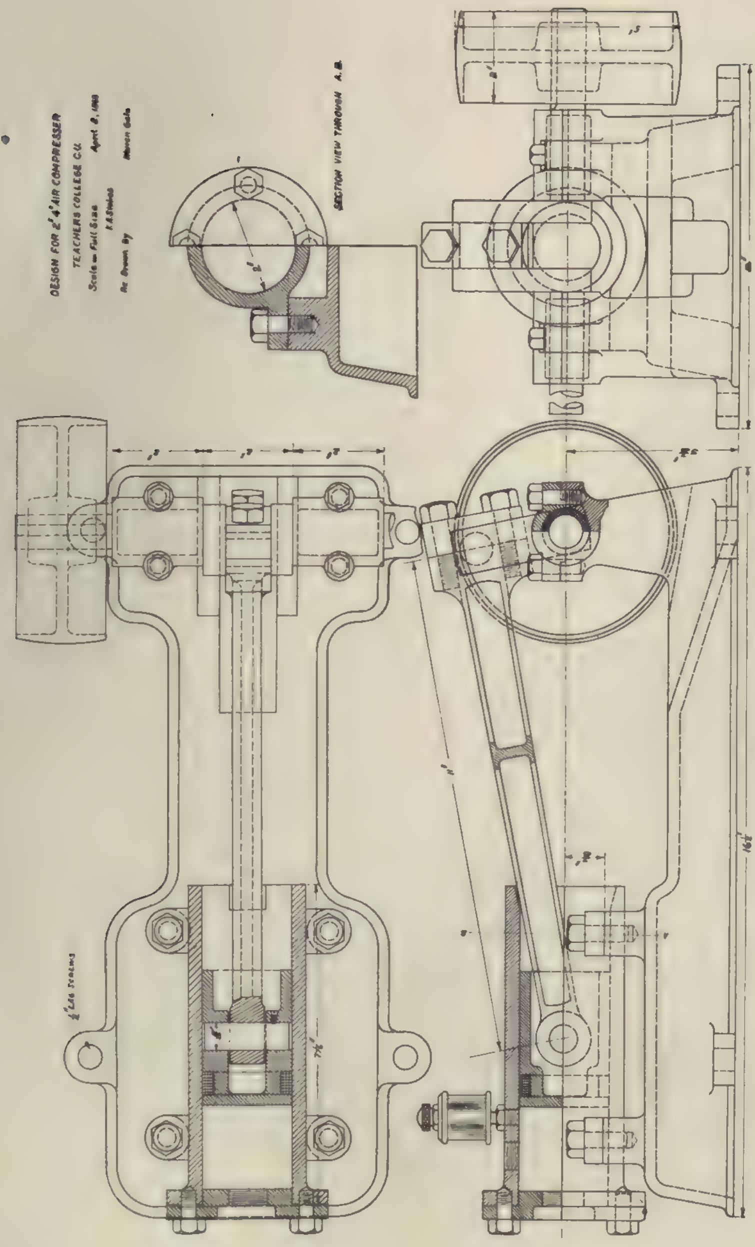

DESIGN FOR 2"x4" AIR COMPRESSER
TEACHERS COLLEGE C.U.
Scale = Full Size
SECTION VIEW THROUGH A.B.

FIG. 1.

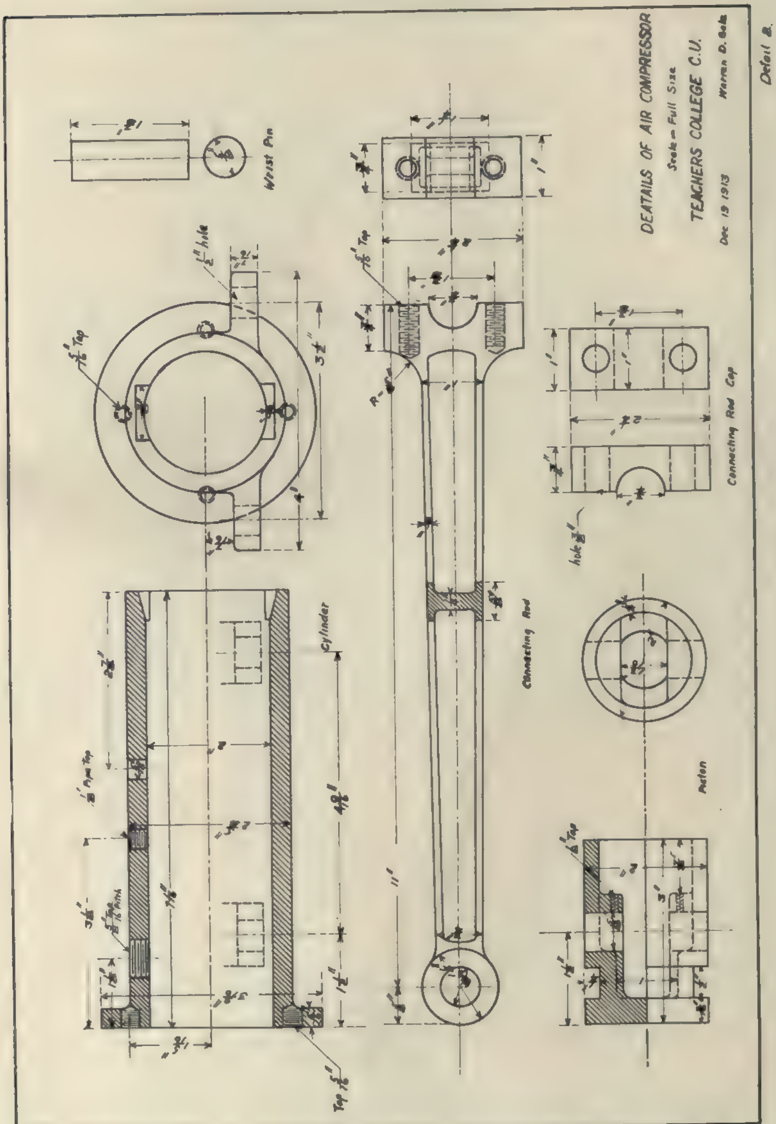

DEATAILS OF AIR COMPRESSOR
Scale – Full Size
TEACHERS COLLEGE C.U.
Dec 19 1913
Detail B.
Wrist Pin
Connecting Rod
Connecting Rod Cap
Cylinder
Piston

FIG. 2.

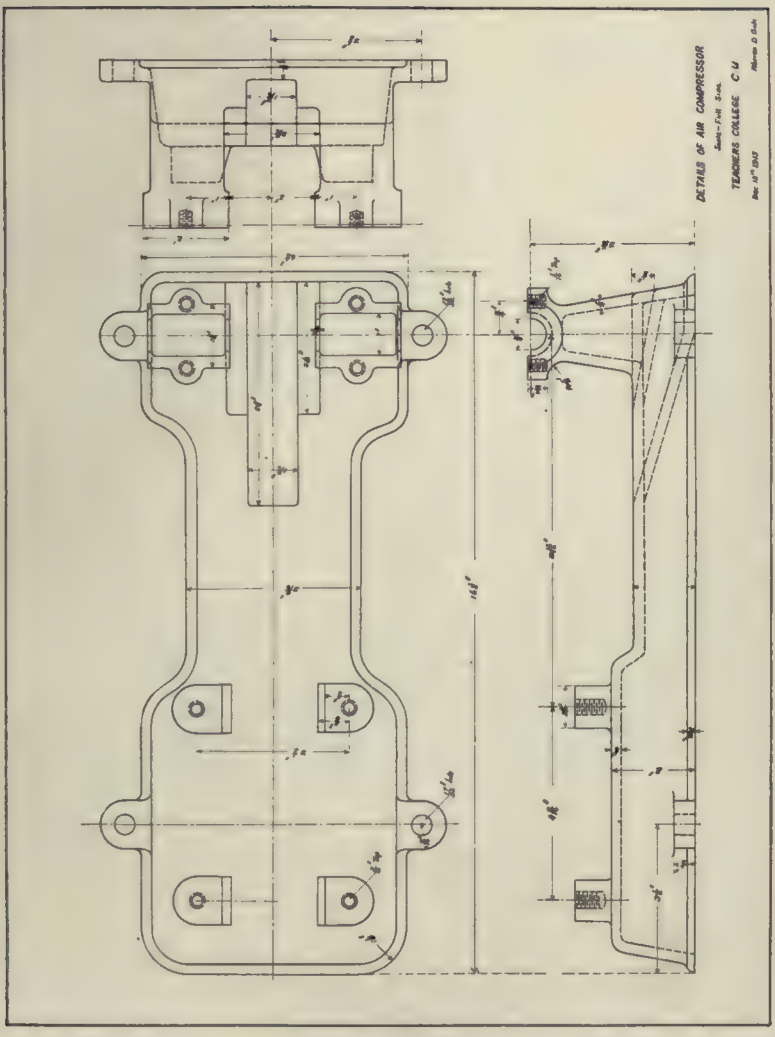


FIG. 3.

leaves its own base core. The only dry sand cores used were for coreing out the main bearings. The bosses for the main bearings were made loose so that the pattern could be easily molded in a two part flask, the bosses being picked out after the pattern had been drawn.

The cylinder pattern was made "split" to facilitate molding, a full core-box being made. The piston pattern was made solid with a large print so that the core would be well supported. The core-box for the piston was made in two halves to produce a solid core; this did away with the necessity of pasting the cores together. The pulley pattern was turned up in two halves and fitted together making a "split" pattern very easily molded. As the shape of the flywheel gave plenty of "draft" it was built up in segments with only the upper half of the hub loose. The pattern for the main bearing cap was made to leave its own core, thus obviating the necessity of having a core-box. The patterns are shown in Fig. 5.

FOUNDRY WORK: MAKING CASTINGS FROM THE PATTERNS.

1. Bed-plate.
2. Cylinder.
3. Cylinder-head.
4. Piston.
5. Cores and core-boxes.

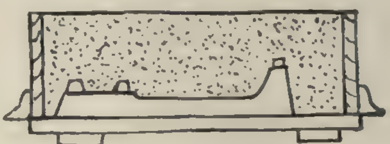


FIG. 6. BED PATTERN IN DRAG.

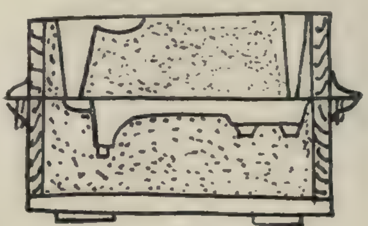


FIG. 7. BED PATTERN IN FLASK.

A flask made of wood was selected for this job with a drag deep enough to allow for an inch of sand or more over the pattern. The follower board was placed on the molding bench, and on this board was placed the drag, Fig. 6. Then the pattern was put on the follower board so that it lay equally distant from the walls of the flask. Enough sand was riddled over the pattern to cover it. Then the drag was filled with shoveled sand. This sand was rammed hard with the hand rammers close to the walls of the drag, but not so hard over the pattern. Then the drag was filled with the sand, the surplus struck off, and it was vented with a vent rod, pushing this vent rod down to the pattern (vent rod is a darning needle with handle.) The bottom board was then placed on this side and flask rolled over, the follower board removed, and the loose sand smoothed with the trowel. The surface was then covered with parting sand (beach sand). This sand prevents the cope sand from sticking to the drag sand. The cope was then placed on the drag. Two round pins are used, one of which is for the sprue, thru which the molten meltal is poured; the other for the riser, and can be much smaller than the sprue pin. The

riser is used to allow the gases and dirt to escape. The sprue pin was placed about an inch from the pattern and the riser was placed on the opposite end about the same distance from the pattern, both pins sticking up with the lower ends resting in the drag. Enough sand was riddled over the pattern to cover it. Then the cope was filled with shoveled sand, and the ramming repeated as in the drag. The surplus sand was struck off, and the sprue and riser pins

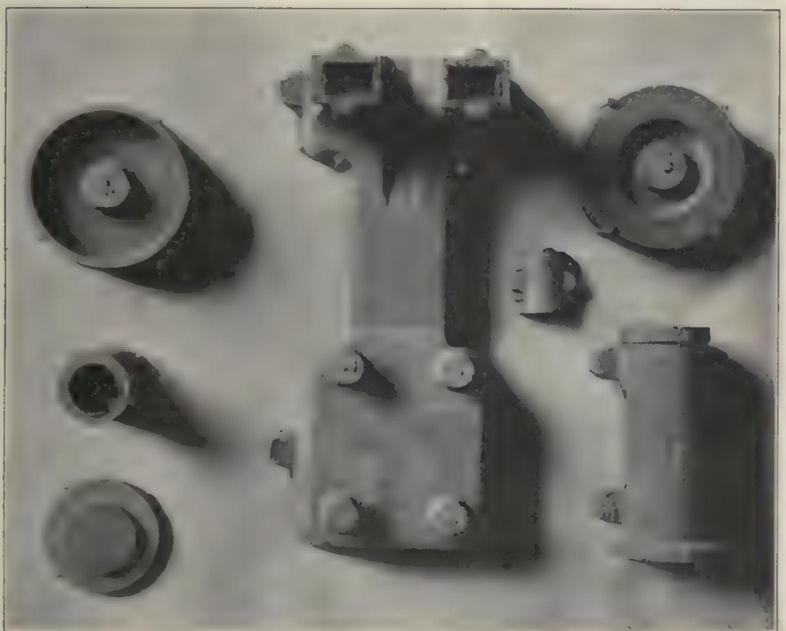


FIG. 8. CASTINGS OF AIR COMPRESSOR.

were taken out. A pouring basin was made at the top of the sprue. This pouring basin or funnel makes it easy to pour metal in to the sprue hole. The cope was then lifted from the drag, all loose sand blown off, and the sand dampened around the pattern with the swab. A draw spike was driven into the pattern and the pattern gently rapped. At the same time it was raised or drawn from the sand. The cores were then set, and a gate cut from the mold to the sprue large enough to admit a good flow of metal. The mold was then clamped and ready to receive the molten metal.

The pig iron and scrap were melted in a 9 inch cupola, and molten metal

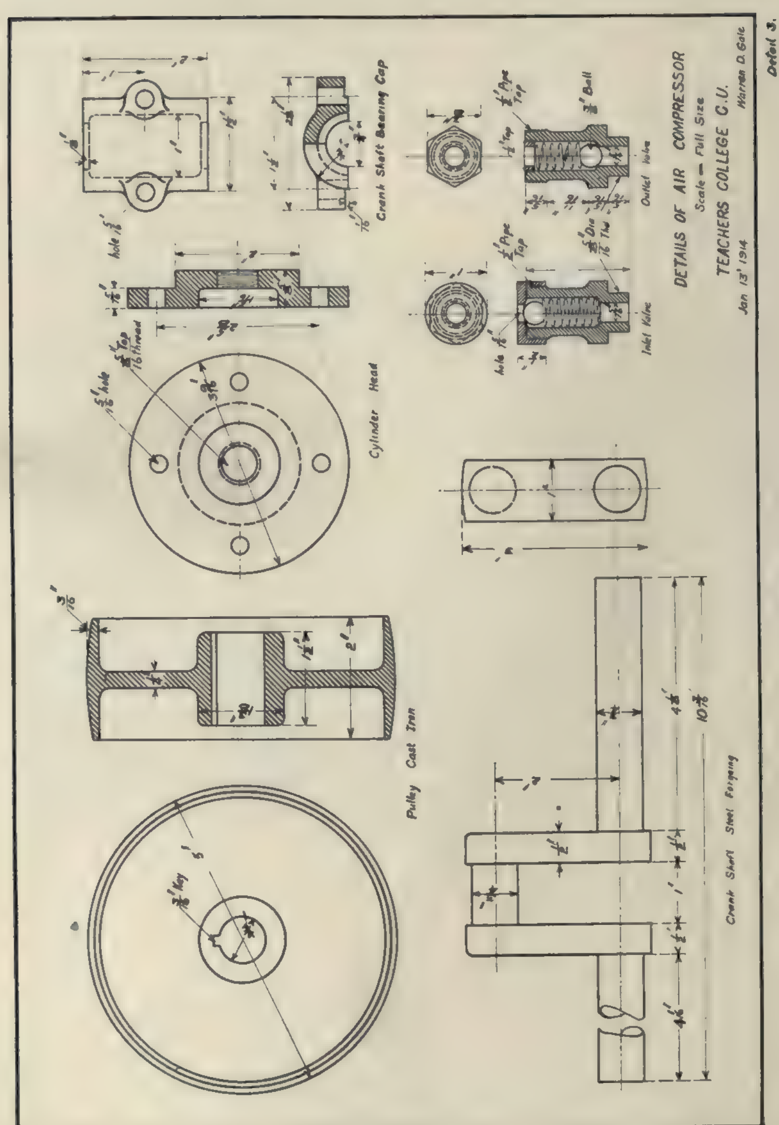

DETAILS OF AIR COMPRESSOR
Scale — Full Size
TEACHERS COLLEGE C.U.
Jan 13' 1914
Warren D. Gale
Detail 3.
Crank Shaft Bearing Cap
Cylinder Head
Inlet Valve
Outlet Valve
Pulley Cast Iron
Crank Shaft Steel Forging

FIG. 4.

was tapped into a hand ladle. The molten iron was then carried to the mold and poured in the sprue, and thence to the pattern.

The castings were taken out of the sand, all burnt sand cleaned off with the aid of a wire brush, and all rough edges ground clean on the emery wheel, Fig. 8.

The process of molding the pulley, cylinders, cylinder-head, flywheel, and other patterns was the same as that explained for the bed-plate. To be sure, each one had its own problem, yet the same principles governed all. (Fig. 9 and 10.)

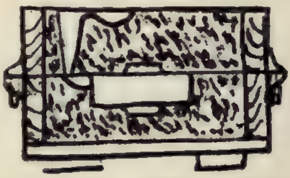


FIG. 9. WHEEL PATTERN IN FLASK.

Cores. The dry sand cores were made from certain proportions of beach-sand, molding sands, and flour. These were all riddled thru a very fine sieve and thoroly mixed. Then enough water was sprinkled over the same to make it lumpy when squeezed in the hand. This sand was rammed into the core-boxes, taken out, and placed in the core-oven to bake. After they were baked they were painted over with wet graphite and again placed in the core-oven to dry, when they were ready for the sand mold. Core-boxes are shown in Fig. 5.

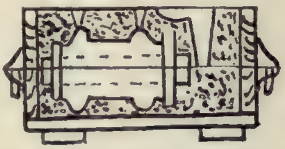


FIG. 10. CYLINDER PATTERN IN FLASK.

FORGING THE CRANK-SHAFT.

This shaft was made from a piece of 45 carbon steel 2x1x10 inch stock. The center was marked with the center-punch. The bar of steel was then placed in the fire, heated in the part marked. When white hot it was taken out of the fire and placed on the anvil. The center-punch mark was placed one inch beyond the outside of the anvil face. The large fuller was placed on the center-punch mark. The helper with the aid of the sledge-hammer drove the fuller into the metal bending it down one inch, Fig. 11. This bent the metal in a definite place on one side of the center-punch mark. The other side was then forged like the first, by placing the bend on the near side of the anvil, and driving it down with the sledge-hammer, Fig. 12. This gives the required amount of stock to make the crank throw. It was then forged into shape on the fuller which was placed in the anvil, Fig. 13. The set-hammer was placed against the side of the throw to reduce it for length, by driving on the head of the tool with the sledge-hammer.

FIG. 11.

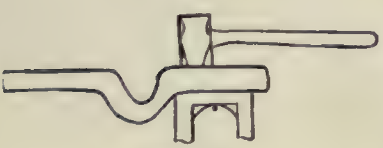


FIG. 12.

For each of the different operations the metal was placed in the fire and heated to a white heat. It was then worked down to a red heat. If the metal is worked at a heat lower in temperature than red heat it will crack, and there is danger of it splitting off. Fig. 14 shows the crank throw about finished and ready for rounding of the ends or shafts. This was done by placing a bottom

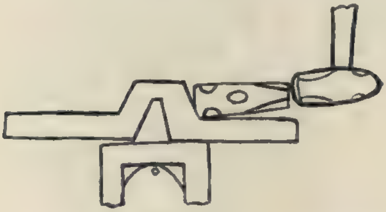


FIG. 13.

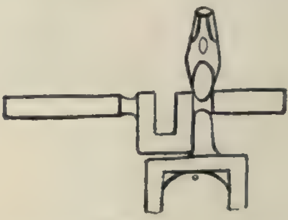


FIG. 14.

fuller in the anvil, and placing the top fuller directly over the bottom. The forging was placed between the two. This was reduced to required size by turning it round and round while the helper was driving on top of the fuller with his sledge. The end of the shaft was then placed on the anvil. With the blacksmith's hammer and the helper's sledge, it was finished round to about ⅛″ larger than required dimensions. See Figs. 14 and 15. Work of this kind requires the help of some one to handle the sledge-hammer. One student helps another.

FIG. 15.

FORGING THE CONNECTING-ROD.

While the general drawings call for a bronze rod, we decided that one made from steel would answer the purpose just as well, and would be very much cheaper.

The heating and forging was the same for this piece as that explained above. A piece of 45 carbon steel 2x1x7 inch was selected. One end was upset large enough to fit dimensions of general drawings, Fig. 16. Then each end was fullered, one end back two inches, the other back one inch from the ends, Fig. 17. The metal was then drawn out between the shoulders and was made ⅛″ larger to allow for finishing and machining. The corners were cut off, Fig. 18, and rounded, Fig. 19. The whole rod was then heated to about 1200 degrees F.

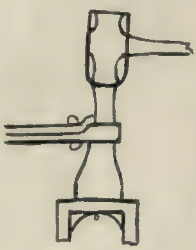


FIG. 16.

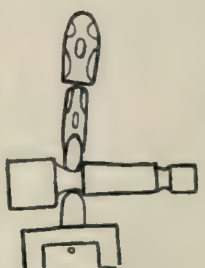


FIG. 17.

and was placed in a box of slaked lime and covered. When it was cold it was then ready for machining.

MACHINE-SHOP WORK: MACHINING THE CASTINGS.

The base was the first casting finished. It was placed on and bolted to the planer bed, bottom upwards, and a very light cut taken off the bottom. Then it was unbolted and turned upside down and again bolted to the planer bed. A light cut was taken off the cylinder supports and bearing cap seats, to get the comparative heights of these surfaces correct. This determined the cylinder and crank-shaft aligment. The bearing caps were next clamped in the shaper vise and planed off; then $\frac{5}{16}''$ holes were drilled for the holes. These caps were then placed in position on the housings, so that the housings could be marked and drilled for $\frac{5}{16}''$ taps. After this they were tapped with a $\frac{5}{16}''$ tap. The caps were then securely bolted in place on the base. The whole bed was bolted to angle plate, and holes were drilled thru the bearings, and then reamed to receive the crank-shaft. The bearings were easily babbited by placing the crank-shaft in place in the bearing, and pouring babbit in and around the shaft, pouring first one half, and then the other.

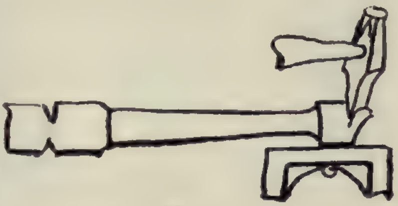


FIG. 18.

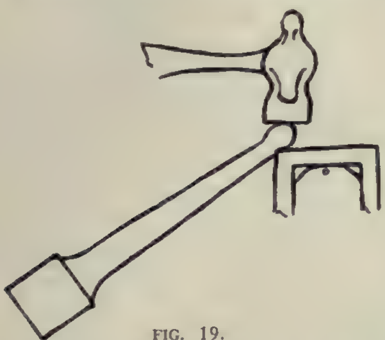


FIG. 19.

Crank-Shaft. The ends of the shaft were centered, placed between the centers of the lathe, and turned to within $\frac{1}{16}''$ of finished size.

Two castings, Fig. 20, with hub on each large enough to receive a $\frac{13}{16}''$ hole and a $\frac{3}{8}''$ set-screw were then made into a jig and the ends of the crank-shaft pushed one into each, Fig. 20. The whole jig with the shaft secured was placed on the surface-plate. With the help of the surface-gage, the throw or crank centers were marked on the dics. Fig. 20 shows the throw centers. It was then placed between the lathe centers and driven by a bolt put thru the face-plate of the lathe and thru the rim of the jig.

FIG. 20.

Since the crank and all the weight was off center, counter weights were placed on the face plate to balance. These counter weights were blocks of cast iron bolted to the side opposite from the swinging crank-shaft. The cranks or throws were now faced off both inside and outside to the required dimensions.

FIG. 21. AIR COMPRESSOR COMPLETE.

Cylinder casting. The small end of the cylinder was placed in the lathe and held fast in the chuck, and the other end faced off. The cylinder was then taken out of the chuck, reversed, and the finished face was clamped to the face plate by its flange. The other end was then faced off and turned true. This was then supported in the steady rest of the lathe and bored to fit a 2″ standard plug gage. Four ½″ holes were drilled in the lugs. The cylinder was placed on the base, the connecting-rod and piston set in position, and the holes marked for alignment. The holes were then drilled in the base and tapped. The cylinder was then bolted to the base. Holes for the oiler, and inlet valves were drilled and tapped as per drawing.

Cylinder-Head. The cylinder-head was chucked and turned, and finished to size, and the screw holes drilled. Then it was put in place and scribed on the flange of the cylinder, after which the holes were drilled in the flange and tapped to fit a ¼″ bolt. The hole was drilled and tapped for the outlet valve.

Piston. A hole was drilled in the piston to fit the wrist-pin by the use of the "V" block on the drill-press. The wrist-pin was made from a piece of tool steel turned to fit hole, and rod and piston were assembled.

Connecting-Rod. The connecting-rod, made from a piece of 45 carbon steel, was planed to fit the dimensions. The cap was drilled for ⅜″ bolts. The cap was then fitted to the rod and marked for the holes which were drilled and tapped. The cap was then bolted in place. The rod was clamped to the drill-press table and drilled and reamed, both for the wrist-pin and crank bearings.

Pulley and Flywheel. The pulley was chucked in the lathe and bored, then it was forced on a ¾″ mandrel. This was put between the lathe centers and the face and outside of pulley turned to size. The flywheel was finished same as the pulley.

Keyways. Pulleys and wheels requiring keyways were placed in the shaper vise and clamped; the keyways were then cut in each with a goose-neck tool clamped in a regular tool-post.

Valves. The machining of the valves presented no special difficulty. The drawing shows that the inlet and outlet valve bodies are exactly similar, except that the balls are placed at opposite ends. The inlet valve has a cap screwed on in place of the discharge pipe on the outlet valve.

ASSEMBLING THE MACHINE.

The cylinder was bolted to the bed. A gasket cut to fit the cylinder-head, and the head bolted in place. The piston was placed in the connecting-rod, and the piston pushed into the cylinder; next the end of connecting-rod was bolted on the crank-shaft. Then the shaft was placed in the bearings, and the bearing caps screwed on. The cylinder was aligned with the piston and bolted to the base. The flywheel and pulley were placed on the shaft and the key fitted and driven home. Oil-cups which can be bought, or made, were then placed on the compressor.

For continuous work small oil-cups should be fitted to the main bearing caps, and one on the top of connecting-rod to lubricate the crank-pin.

CURRENT ITEMS

THE INDIANAPOLIS SEMI-INDUSTRIAL SCHOOLS.

The number of grammar schools being conducted as semi-industrial or pre-vocational schools has increased rapidly during the last year. Many of them are developing as a part of the manual arts department in a city system. We believe, therefore, that the following details concerning the semi-industrial schools of Indianapolis, Indiana, will prove helpful to a number of supervisors and superintendents.

These semi-industrial schools embrace the work of the seventh and eighth years. The program of studies is divided into three sections, one—theory, two—practice, and three—study. Six hundred and thirty minutes a week are devoted to theory, 400 to practice and 465 to study, and recesses, etc., totalling 1,500 minutes a week.

Under "Theory" are listed English (composition, reading, spelling, grammar); mathematics, geography, history and civics as one period; hygiene; penmanship; music; and drawing. Under "practice" the work is arranged for boys and girls separately. The boys have 1. Shop work, (a) benchwork (b), mechanical drawing and designing; 2. Printing; 3. Iron work. The girls have home economics as (a) cooking, (b) housekeeping, (c) sewing, (d), cleaning and dyeing of textiles, (e) weaving, (f) mechanical drawing and designing.

The following notes on the "theory" side of the program show the effort to lend an industrial content to the academic work: "Some reading should be done in connection with the industrial work, during the reading periods, in "Shop" and "Home Economic" time, and at home. Books should be read and discussed which throw light on the general industrial problem, which give information on the various available occupations, and which deal with specific materials used by the pupils;" regarding mathematics, "the course of study laid down for the regular schools will be followed. The material for examples will, however, be drawn as far as possible from the work actually going on in the shop, sewing room, and kitchen. Shop records for labor time, quantity and cost of material, etc., will be kept under the direction of the industrial teachers. Bookkeeping will be taught to the extent that it is actually needed in the conduct of the shop. sewing-room, and kitchen;" in regard to geography and history, "Without neglecting the course of study laid down for the regular schools, the geography and history of industrial and commercial activities should be emphasized in the general reading and in the periods devoted to these subjects."

The following outlines of the courses in shop work will be of value for comparative purposes:

Bench Work, (Including woodwork and some simple metal work.) Four and one-half hours per week.

Mechanical Drawing and Design. One and one-half hours per week.

Printing. One and one-half hours per week.

BENCH WORK—(Seventh Year.)

1. ***Squaring up stock to size*** and ideas involved in simple problems in woodwork, such as bread-board, etc.

2. Use and care of simple woodworking tools such as plane, saw, rule, gauge, knife, brace and bit, hammer, chisel, screwdriver and spoke shave and ideas involved in making single pieces or pieces assembled with screws, nails and glue with no more difficult construction than butt joints.

3. Theory and practice in sharpening knife, chisel, plane-bit and spoke shave-bit.

4. Group projects for the schools involving, for some of the more expert boys, some of the more difficult joints, but for the majority of the class mainly a repetition of the above in larger dimensions.

5. Finishing with stain and wax. (The group projects sometimes involve finishing with paint or occasionally varnish. This is done as before mentioned by the more expert pupils.)

6. Talks on tools. Talks on lumbering. Visit to lumber yard.
Visit to Atkins' Saw Works.
(The work in Section 6 is done in connection with composition work and English work. The teacher of English is present at the shop talks and makes the visit with the pupils, in order to have accurate data for the work in English.)

BENCH WORK—(Eighth Year.)

1. Use, sharpening, and care of a comprehensive set of woodworking tools. (Also used in connection with English work.)

2. Problems involving cross-lap and grain joints.

3. Study of wood construction. (Difference between table-top and door construction, drawing board and floor construction, weather-boarding and wainscoting, etc.) (Also in connection with English work.)

4. From this point on the work is individual, chosen by the boys under supervision of the teacher. A mechanical drawing of the special project is required carefully worked out and dimensioned. In this special project the form of construction is dependent upon the ability of the individual. Sometimes a joint or difficult part of the work is required to be made before permission is granted to undertake the work.)

5. Finishing with stain, wax, filler, paint or varnish.

6. Shop visit to furniture factory. Shop visit to paint works.

The metal work is done in connection with the woodwork such as sled runners, braces, ties, hinges, pulls, etc., worked either hot or cold. (No *exercises* in metal working are undertaken just as *exercises*.)

MECHANICAL DRAWING—(Seventh Year.)

1. Layout of sheet.

2. Use of instruments, T square, triangles, pencils, scale, compass.

3. Quality of line.

4. Principles of projection.

5. Meaning of use of lines: projection, dimension, center, and lines indicating surface.

6. Lettering—alphabet of simple Roman letters and figures.
7. Simple working drawings involving hree views.
(The drawings are confined to problems made in the shop.)

MECHANICAL DRAWING—(Eighth Year.)

1. Mechanical drawings of shop problems (in pencil rendering) involving three or more views, cross-sections and details.

2. Detail and assembly drawings of individual projects.

3. Mechanical drawing and structural design. (Work in school projects such as built-in book cases, desks, sewing tables, etc., work in which the design and construction features are important factors.

PRINTING—(Seventh Year.)

1. Learning the case (taught at first by making a mechanical drawing of the case and subsequent drill.

2. Setting large point type (16 and 18 point).

3. Proof reading and proof markings.

4. Running hand press. (Imposing and making ready done by advanced pupils.) Care of the press.

5. Setting 8 and 10 point.

6. Proof taking and reading.

7. Setting, proof reading, and imposing simple card or letter head.

8. Distributing.

9. Setting and imposing simple program or poem.

10. Setting, proof reading, imposing and making ready, simple card or letter head. Press work on hand press.

11. Setting, proof reading, imposing and making ready, program or poem. Press work on foot-power press. Care of the press.

PRINTING—(Eighth Year.)

1. Speed and accuracy is the object of the year's work.

2. Planning and arrangement of job work.

3. Display headings.

4. Choice of stock and ink for job work.

5. Mixing colored inks for special jobs.

6. Modern processes discussed and illustrated, and some experiments made by the class—zinc etchings, half-tones, chalk plates, wood cuts, electrotypes, lithographs, etc.

7. Visit a newspaper plant.
Visit to job printing plant.
Visit to book printing and binding plant.
(The above in connection with work in English.)

The job work done in the printing classes has been principally on work for the schools, such as programs, poems, reading and spelling lessons, letter heads, blank forms, ec.

No work has been taken for profit. The few jobs done for individuals outside the schools have been done without charge except for materials.

WOODWORK IN RURAL SCHOOLS.

On page 315, Volume XII. of this magazine will be found an outline of a plan for carrying on woodwork in rural schools. Clinton S. Van Deusen, the author of that article, has had faith in the plan ever since he first thought of it, and almost continusuoly since then he has had some work of that character carried on under his supervision. This year he has the opportunity he has wanted of actually doing the work himself. This is made possible by the state of Ohio acting thru the Kent State Normal School, with which institution he is now connected.

Each Wednesday morning Mr. Van Deusen starts out with a horse and buggy, hired from a livery, and arrives at his first school at about 8:15. He remains there about forty-five minutes, consulting with the boys most of the time. He examines the work they have done, and commends and criticizes as needed. He leaves material and typewritten instructions to be followed on advance work, and if necessary, explains some of the more difficult work to be taken up the coming week. Parts that are made clear in the instructions he refuses to discuss with them, but requires them to get it from the instructions. The boys work, one at a time, from two to three hours each week, mainly on schedule, but at times as a reward for faithful work in other school subjects.

He visits during the day six one-room rural schools and in five of them directs benchwork as explained above for boys from the sixth grade up. He also directs coping-saw work in the six schools for girls from the fourth grade up and for boys in the same grades not taking the benchwork.

The benches similar to the one shown in the illustration on the next page are loaned to the schools by the Normal School but are to be replaced by similar benches that the boys are making from S4S material.

The work being carried on this first year emphasizes the use of the saw, and is similar to that explained on page 183, Vol. XIV. of this magazine.

The following test questions were given at the close of the first twelve weeks:

Test in Manual Training—Fall Term, 1913.

"1. Is the working side (W. S.) on the broad or narrow surface of a piece of wood and how should it be marked?

"2. Name the parts of the try square.

"3. Write out in detail how you would square a line around a piece of wood.

"4. Take a clean piece of material of any thickness and width, mark the W. F. and W. S. as you think they should be and saw a piece 4″ long from it. Mark your name on it and hand it to your teacher."

The letter shown below was given to the boys taking the benchwork in the week following the test:

"To the boys taking benchwork in wood in the schools of Franklin Township

"I had hoped that the experience you have had in your manual training during the fall term would have developed in each of you several habits that will help you do effective work with wood. To acquire a habit, an operation

must be done in a definite way at least several times, and it is better if it can be done many times. Judging from the results of the tests I believe that most of you have made a good start in acquiring some of them. I trust that very soon I can say that all of you have acquired all of them.

"To help you, I give them below:

BENCH USED IN RURAL SCHOOLS.

"Habit No. 1—*The Habit of Marking the Working Face.*

"A single light slanting pencil line should be made on a broad surface of each piece of material to be used, to designate that surface as the working face (W. F.)

"This is the first thing to do with the material, but do not mark on material that you are not to use.

"Do not make the line heavy. It should only be heavy enough so that you and I can see it when we look for it.

"Habit No. 2—*The Habit of Marking the Working Side.*

"Two slanting light pencil lines should be made on a narrow surface of each piece of material to be used, to designate that surface as the working side (W. S.)

"Make sure that the marks referred to under Habit No. 1 and Habit No. 2 are on each piece when sawed from the material.

"Avoid making other marks on your pieces except your initials and such other marks as you are directed to make.

"Habit No. 3—*The Habit of Knifing Around Correctly.*

"The beam of the try-square should be pinched tightly against the W. S. when knifing the lines on the W. F. and the surface opposite and against the W. F. when knifing on the W. S. and the side opposite.

"At first the knife line should be made lightly along the blade of the try-square and then go over the line, making it deeper.

"Habit No. 4—*The Habit of Measuring and Sawing Accurately to Length.*

"You should now be able to saw pieces, at least, to within 1/64" of the correct length, but it requires care in the measuring and in the sawing to do it.

"The habit is well worth the effort necessary to acquire it.

"I would suggest that you keep this letter and read it again after a few weeks. I trust you may then feel that you have made progress.

"Yours for the acquiring of good habits."

Mr. Van Deusen is having an opportunity to study the rural school problem at first hand and will be able to modify his plan as he finds the conditions demand.

NEW MANUAL ARTS BUILDING, LOS ANGELES STATE NORMAL SCHOOL.

The manual arts building shown above is one of a group of ten new buildings in course of erection at the Los Angeles State Normal School, Los Angeles, California. The cornerstone of the administration building was laid November 18th, and the date of expected completion is August 15th. The manual arts building is 226 feet by 86 feet. It contains departments for cabinet work, pattern making, mill work, and a glue room, a finishing room, a lumber room and rooms for forging, for machine shop practice, foundry work in iron and brass, mechanical drawing, and rooms for lectures. This building, like the rest of the group, is built of dark red ruffled brick, with clay tile roofs, and artificial stone trimmings.

A NEW PLAN IN PITTSBURG.

Frank H. Ball, director of industrial education in Pittsburg, Pennsylvania, has originated a new plan or system of unit credits for public school work. By means of this plan a pupil will receive a certificate of credit at the completion of each unit of work, and a more elaborate certificate on the completion of a group of units. Thus a pupil may have, to show to prospective employers or other interested people, certificates of credit of some degree altho he may leave school before the usual "graduation" from the eighth grade. Pupils leaving school before completing the eighth grade under the regular school system, have lost all evidence of credits for the work accomplished.

The new system is being tried at two Pittsburgh schools, both of the ele-

mentary industrial type, the North Industrial School, and the Irwin Avenue Industrial School. In these two schools the full term is only two years. Certificates are granted every two months. As there are twenty school days in each month, there is a "graduation" in the industrial school every fifty days. The unit courses are so arranged that at the end of the two-month period the pupil can do one thing expertly with his hands and that fact is plainly stated on the certificate he gets. Five certificates represent a full year's work.

The unit course is defined as a brief course or limited number of lessons meeting some specific and common need or requirement of a group of workers. In this system of unit courses time is not considered as important a factor as the accomplishment of the principles and practice outlined in each unit. The principles of drawing in all departments are the same, but their application is developed in connection with the actual work done in each shop.

The outline of the unit courses in sheet metal work are given here as an example of the organization of material under Mr. Ball's system.

SHEET METAL.

FIRST UNIT. 150 Hours	SECOND UNIT 150 Hours	THIRD UNIT 150 Hours	FOURTH UNIT 150 Hours
Names of tools. Use of tools. Lectures on the use of bench machines. Lectures on sheet metals.	Cost keeping. Time keeping. Lectures on cornice work.	Cost keeping. Time keeping. The theory of practical work given in this unit. Principles underlying the development of a face meter.	Time and cost keeping. Shop organization. Visit to Carnegie Institute of Technology, Sheet Metal Department. Lectures on the use of electric signs. Use of hand hammering tools.

DRAWING.

Principles of Mechanical Drawing.	Fundamentals of geometrical projection. Radial line development. Blue print reading.	Geometrical drawing. Development of two and three piece 6″ elbows. (Square)	Pattern Drafting for concrete forms and for general sheet metal work. Designing of concrete forms.
Care of soldering copper. Methods of soldering. Proper use of flukes.	Wiring irregular shapes. Forming irregular shapes. Doubling irregular shapes.	Transferring of the patterns of the two and three piece elbows to the metal, allowing laps, etc.	Working in concrete original designs to be Butt soldering. Raised letters. Repousse work.

Practical use of hand tools, square, shears, bar folder, operating bench.
Grooving machine.
Sledging machine.
Burring machine.
Thick edge machine.
Setting down machine.
Double seaming machine.
Wiring machine.
Crimping machine.
Doughnut cutters.
Biscuit cutters.
Round shaped.
Diamond shaped.
Heart shaped.
Star shaped.
Animal shaped.
Square pans.
Pitched pans.
Funnels and buckets.

Perforating.
Special processes in hand work.
Practical use of hand brake and wood forms.
Forming and assembling of simple moulds.
Transferring of full sized details to metal.
Special school work.
Projects.
Collender.
Sink strainer.
Cake mould.
Sprinkling can.
Detailing simple moulds.

Cutting blanks.
Forming blanks.
Turning double edge.
Turning single edge.
Assembling cylinder.
Grooving seams.
Forming and assembling face meters.
Special school work.
Ornamental concrete sheet metal forms.
Mixing of concrete.
Projects.
Picture frames.
Card holders.
Card trays.

Electric signs.
Projects
Lawn vases.
Flower boxes.
Hand hammering in copper
Brass etching.
Marquiese and their use.

RURAL SCHOOL MANUAL TRAINING.

In Berks County, Pennsylvania, the school authorities are deeply interested in rural school improvement, including the introduction of manual training, domestic economy, and agricultural lessons. County Superintendent E. M. Rapp, has published a leaflet entitled "Country School Betterment," which sets forth in detail many valuable suggestions which will repay study. He makes a plea that the normal schools prepare rural teachers in the industrial subjects, enabling them to interpret to the pupils their natural and industrial environment.

He believes that the ideal teacher for a rural school is a country-reared graduate of an agricultural college. The great obstacle to the rapid spread of manual training in the rural schools is the lack of teachers trained in the subject. Even so, Berks County is more fortunate than many other sections, since a large proportion of the teachers are men, a number of whom have a natural aptitude for woodworking.

One such, Lawrence C. Kline, teacher of the Friends' School, is a pioneer in rural school manual training. A brief mention of the beginning of his work was made two years ago in this department. A more definite account of that beginning and a report of progress may serve to inspire other rural teachers and county superintendents to make the most of the means at hand.

The Friends' School is a standardized one-room school, equipped with single desks, a reading-table on which are found the current issues of half a dozen of the best magazines, a bookcase containing the school library, an individual drinking-cup cabinet, paper towels, and benches and tools for manual training.

At the beginning an improvised workshop was fitted up in the attic or loft, the equipment being limited to a brace with several bits, a plane, a hatchet, a saw, a chisel, and a square. With these the first task was accomplished, that of demolishing the old desks stored in the attic and preparing the wood for use. When planed and squared up the material thus secured was made into drawing boards, T-squares, triangles, etc. The lighting of the loft was, of course, poor and it could be reached only by a ladder thru a hole in the ceiling. The teacher and pupils determined to have more convenient quarters for the shop, so last year they began early in the term the work of excavating for a room under the school. This was no easy task as the building stood over red shale rock, but the work was finally accomplished and the finishing rapidly followed. The floor was made of cement. The room is reached thru a trap door in the school-room floor.

About fifty dollars' worth of new equipment was purchased, the funds coming from private donations or school entertainments. The benches, tool cabinets and such equipment were made by the students.

All work in the shop is done outside of the regular progrom, mostly during the noon intermission. The boys have made the reading-table, cup cabinet, picture frames, and clock frame for their room and are now engaged in making the driking-cup cabinets to sell to other school districts, thus getting a commercial view-point in the work as a further step in industrial life. The girls sew while the boys are in the shop.

The progress made in this work is doubtless due, in no small degree, to the inspiration and originality of the teacher, who lives in the county and is devoting his life to this school. He has been in the Friends' school eight years, and has refused many offers of more lucrative positions. This permanency of interest is a thing greatly to be desired in the rural school work. Mr. Kline attributes much of his success to the encouragement of his school director. Rural school betterment will come more surely with the multiplication of such devoted teachers and such understanding and helpful directors.

Not long ago Congress passed a law providing for a Commission to study and report upon the subject of federal aid to vocational education. This commission has now been appointed and consists of the following members: Senator Hoke Smith, chairman, and Senator Carroll S. Page, representing the Senate; Congressman Hughes of Georgia, and Congressman Fess of Ohio, representing the House Committee on Education; Charles A. Prosser; Charles H. Winslow, representing the Department of Labor; John A. Lapp, connected with the passage of the Indiana vocational education law; and Miss Florence Marshall, principal of the Manhattan Trade School for girls, and Miss Agnes Nestor of Chicago, who represent the field of woman's work in vocational education.

FOREIGN NOTES

Crafts for boys are encouraged by the Scout Movement under Sir Robert Baden-Powell. Up till 1913, 255,793 badges have been awarded for passing examination tests in various handicrafts. It is worth while to specify the numbers of some crafts, as follows: Blacksmith, 2,777; Carpenter, 6,202; Cook, 12,301; Handyman, 12,106; Photographer, 2,322; Printer, 2,850. To obtain the woodwork (carpenter) badge, a boy must make dovetail and mortise-and-tenon joints, must shute and glue a butt-joint 4 ft. long, and make a tool chest, table, or other article of similar difficulty and utility, complete. Many boys qualify for their badges in the day school and many more at evening school. In these cases the instructor testifies that the work has been properly carried out. I have yet to hear of an instance where it has been badly carried out. Somehow, the desire to win that scout badge makes a dull boy brighter, and a bright boy positively dazzling.

At a conference of Educational Associations recently considerable attention was given to manual training. Miss Dora Walford (City of Leeds Training College) said "that a vast amount of handwork done in schools at present was sheer waste of time because the principle which constituted its fundamental claim to a place in the curriculum was neglected, and the work was mainly dictated, collective and uniform."

Mr. J. L. Paton (Manchester Grammar School) warmly praised "the practice of handicraft in schools. Manual training not only taught usefulness, but inculcated a certain aesthetic idea, and if they wanted to stop vandalism it was to manual training that they must look. Colonel Ulick de Burgh (Deputy Chief of the Boy Scouts) suggested that teachers should incorporate in the intellectual education given in the schools more of the Scouts' systematised manual training, with constant and definite appeal, in both work and play, to all that was best in their boys. Miss Cleghorn (Ex-President of N. U. L.) spoke of the importance of training girls in housecraft. Already in such places as London and Bradford splendid training was given. But the Board of Education must make such training compulsory in the schools.

At the above-mentioned conference manual men held a meeting of their own. Sir John A. Cockburn, who took the chair, said that education should be not a preparation for life, but a part of life. The problem was not how to fit manual training into the framework of the school curriculum, but how to get the other subjects fitted round manual training. Mr. J. H. Judd (Manchester) who gives so continuously and generously of his best for manual training, and whose many activities show no signs of falling off, said that twenty-five years ago Sir Philip Magnus laid down good rules for the conduct of manual training, but the subject had not yet got beyond the permissive stage. Much of the success achieved by manual training was due to its comparative isolation for twenty years. Mr. Judd concluded by appealing for a national scheme of

handwork, all-embracing in character. Mr. H. Holman read a paper on "Some Dangers Concerning Handwork Teaching." Danger 1. Regarding manual trainig as a universal specific. Danger 2. The cry for the vocational rather than the educational, especially as to elementary schools. Danger 3. Using manual training to "sugar the pill" i. e. using it as a factitious means of rendering unattractive subjects somewhat more tasty. Danger 4. The heuristic method. Danger 5. Handwork as a method. Danger 6. The neglect of a proper development of skill.

At the same meeting, Prof. White of Dunedin University, said that thirty years ago he moved a resolution that manual training should form no part of the national system of education for New Zealand. Prof. White has done some more thinking in those thirty years, and now he takes pride in the fact that manual training is compulsory in all the schools of New Zealand and in the training of teachers. Quite a number of ex-London instructors are working in New Zealand.

Says *The Journal of Education*:—"An experiment which has been tried in Leeds and elsewhere, might be adopted generally, not only for the older girls, but, with suitable forms of manual instruction, for boys in nearly all schools. In Leeds sets of girls in the poorer districts of the city were allowed to devote the major portion of their time during the last period before leaving school to instruction in home management and allied subjects. The girls evidenced an interest and an enthusiasm in the work such as would not be possible where the instruction is spread over long periods and in lessons given once a week." Perhaps! It all depends how far vocation is to dominate the curriculum. There is much to be said for and against the experiment. And what is good for Leeds may be unsuitable for, say, the Cinque Ports.

The Cheshire Education Committee has decided that its children who attend the cookery classes shall do their own shopping. The purchase money will be given to the girls themselves, and they will be sent out, before the cookery lesson begins, to buy the meat, vegetables, flour, and other commodities required for the lesson, at first accompanied by the mistress, and then "on their own."

Says *The Times of Liverpool*:—"It has been held that "fads" are officially recognized; but when these "fads" take the form of better music, art, and handicraft it would be more reasonable to consider that a real movement towards self-expression and self-training is being made."

In her presidential address, Miss Hewitt of the East Ham Teachers Association said, "With regard to handwork and its bearing upon the mental training there was much which could be said, but an attitude of caustic suspicion towards handwork was the safest for the teacher." I suppose you could beat that utterance in America, but you would have to search hard even to equal it. What are we to make of a really intelligent teacher who talks like this? And

yet there are thousands like her in Great Britain who consistently adopt towards manual training "an attitude of caustic suspicion." I think it would do them good if they only knew our cuastic opinion of them. "Ephraim is joined to his idols, let him alone," is, perhaps, the best way to dismiss them from our thoughts.

Interesting accounts have recently appeared in the English papers of the "Little Commonwealth," which is situated at Batcombe in the county of Dorset, one of the most beautiful and sparsely populated parts of England. This commonwealth is intended for the reclamation of delinquent boys and girls, and its superintendent, Mr. Homer Lane, is an American from Detroit. A substantial, stone-built farmhouse is the central seat of government and a "House Court" for internal affairs, and a "Community Court" for external affairs are the chief means of law and order. A capacious barn is being converted into a large assembly room, and in a cottage near, nine babies who have been rescued from disreputable surroundings are being fostered and educated on Montessori lines. The boys work under exactly the same economic conditions that they will find in later life. Here is a young carter with his wagon of building materials; here is a youthful engineer in charge of the petrol engine at the water-pumping station; along the lane the hedge-trimmers are at work, while the masons are busy constructing a wall around the settlement. Other crafts, such as carpentry, bookbinding and market-gardening for the boys, and laundry work for the girls will be taught in due course. The Earl of Sandwich has most generously given the Commonwealth an estate of 200 acres on a lease of 30 years. So in the romantic county of Wessex, which has been immortalized by the great novelist, Thomas Hardy, is the still more romantic newer education, under energetic and enthusiastic American supervision, to aid in the making of that better nation yet to be.

For purposes of manual training organization, London is mapped out into four districts, each of which is placed under an organizer, whose duties now greatly resemble those of an inspector, but whose salaries are much less than those received by assistant inspectors. These organizers have just been placed on a new scale; from £200 to £300 by £10 increments. On this scale, they will be receiving at their maximum only £50 a year less than a form master in a secondary school. This its a sample of the prospects afforded to good men who take up manual work in England. A man whose duties take him into nearly a hundred centers and three hundred schools gets less pay than the man in the class room with about thirty pupils. Is it the classics that do it?

REVIEWS

The Book of School Handwork. Edited by H. Holman, formerly professor of education in the University of Wales. Caxton Publishing Company, London. To consist of six volumes, each 9½x6½ inches, containing about 240 pages; illustrated with color plates, plates of half-tones, also line drawings in the text; price 8 s. and 6 d. in London. Volume I and II already issued.

This is by far the most comprehensive work on the manual arts in school work ever published. As stated in the subtitle, it is an "encyclopaedia of educational handwork subjects, methods, materials, tools and organization" so far as England is concerned. It is written by the men who have made handwork a recognized school subject in English schools. Among these are Sir John Cockburn, president of the National Union of Manual Training Teachers, who writes from the standpoint of a scientist, Sir Philip Magnus of the City and Guilds of London Institute, who considers the vocational bearing of handwork, Dr. Lyttelton, Headmaster of Eaton, Professor J. J. Findlay of Manchester University, Professor J. A. Green of the University of Sheffield, Dr. Percy Nunn of London University, Inspector P. B. Ballard of London, J. T. Bailey of Rochester, G. F. Johnson of Liverpool, J. H. Judd of Manchester, J. Vaughan of Glasgow, Charles H. Binns, H. Williams Smith, and James Boorman of London, John Arrowsmith of Halifax, Charles Bird of Leicester, and many other men and a number of women who are leaders in organizing the several types of handwork that are rapidly becoming a part of English elementary school work. Every effort has been made by both editor and publisher to make this "an encyclopaedic survey of the 'why' and the 'how' of handwork for the schools."

One who knew English schools ten, or perhaps five years ago might wonder how it can be that England has reached the point where such a book is needed, but he finds his answer in part, at least, in the prospectus of this book. It points to a significant series of events: In 1897 a National Commission was appointed to determine how far and in what form manual and practical instruction should be included in the educational system of the elementary schools of Ireland. The report urged that "hand and eye training" should be given in all the primary schools under the National Board. In 1909 the Board of Education of England and Wales issued a report on handicraft in public elementary schools which gave as a conclusion that handwork was an essential feature of elementary school work and that it should be continuous "from the infants' stage upwards." Next came the London County Council's report of a conference on the teaching of handwork in 1912, which recommended "that handwork of some kind form a part of the training of every child during its school life." "We are satisfied," says the report, "that handwork is an essential part of the school curriculum. * * * The school must be the place where this form of education must be systematically given." And recently Lord Haldane, on behalf of the Government, has stated that a new education bill

will make provision for a broadening of the curriculum, "particularly in the direction of increased manual and technical instruction in primary schools."

From this it is easily seen why there is need for a presentation and probably a sifting of the several types of handwork that have come into more or less prominence in the schools. The former, Mr. Holman proposes to accomplish in his great work. He says that "every known point of view with regard to modes of teaching" will be represented in the book—"the subjectist, methodist, heuristicist, self-expressionist, formal disciplinist, didacticist, informationalist, correlationist, recapitulationist," and very likely he will discover new ones to add before the six volumes have been completed. The sifting process will probably begin soon after all the theories are presented. We heartily commend the editor's democratic method and the publisher's faith in English teachers.

It is evident that the movement for "vocational education" is having the same beneficial effect upon handwork in the schools of England as it is in America. Mr. Holman says in his introduction that "the outcry of today for 'practical' education is most fortunate and helpful, inasmuch as it comes just when the most advanced educationists are fighting to secure a place for educational handwork in the ordinary curriculum of schools." He would, however, be sure to avoid having handwork become "primarily vocational in the industrial sense." His fundamental viewpoint is made clear when he says that "handwork is essentially necessary to the best form of true education, and that its primary function is educational and not industrial."

We expect to review the individual volumes of this work at some length in later issues. —C. A. B.

How to Know Period Styles in Furniture, W. L. Kimerly, Grand Rapids Furniture Record Company, 6x9½ inches; 147 pages, price.

Altho this book was intended for a handy reference book, giving a brief history of furniture styles for the busy furniture dealer and salesman, the teacher who wishes to know the various styles and has no time to go more deeply into the subject, will find it of service. It is profusely illustrated.

Pencil Sketching, George W. Koch, The Prang Company; 8¼x10¼ inches; 60 pages; price

This book covers in a brief but pointed way the subjects of method in applying the pencil, rendering foliage, flowers, and leaves, and sketching from life. "Direct" pencil handling is advocated thruout. The full-page illustrations are unusually well produced and are deserving of the highest praise. The book as a whole is a timely and welcome addition to the too-small group of books of really high standard on phases of art work.

Simple Garments for Children, M. B. Synge, Longmans, Green and Co., 6½x8½ inches; pages 47; price $1.25.

This book is a worthy attempt to induce the simplification of children's clothing by providing a group of patterns with detailed directions and numerous illustrations of the sort of garments considered comfortable and hygienic. The

unique feature of the book is that tissue-paper patterns for the garments are included in a pocket or folder inside the book.

RECEIVED.

Elementary Education in England, I. L. Kandel, Bulletin No. 57, 1913; United States Bureau of Education.

This bulletin contains an interesting chapter on the teaching of special subjects, including manual training. It is illustrated.

Twenty-Ninth Biennial Report of the Superintendent of Public Instruction, State of Illinois.

This contains the report of the Illinois Educational Commission in which is included "A Course of Study in Manual Training for the Graded Schools," and "What Can Be Done in Manual Training in the One-Room Country School," together with other valuable outlines which have been much in demand.

National Education Association, Addresses and Proceedings, Salt Lake City Meeting, 1913.

The Farragut School. A Tennessee Country-Life High School, A. C. Monahan and Adams Phillips; Bulletin No. 49, 1913; United States Bureau of Education.

Statistics of State Universities and other Institutions of Higher Education Partially Supported by the State; Bulletin No. 60, 1913; United States Bureau of Education.

North Bennet Street Industrial School; Boston, Mass.; Annual Report, 1913.

Annual, Edgar County Public Schools; 1913-14; George W. Brown, Superintendent.

This annual from one of Illinois' most progressive counties contains a valuable chapter on "The New Country Life."

VOLUME XV NUMBER 5

MANUAL TRAINING MAGAZINE

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THE PURPOSE OF MANUAL TRAINING.

FORREST E. CARDULLO.

ONE of the unsolved problems in educational work is the purpose of manual training. I have seen a great many schools with a fine technical equipment, whose students were doing creditable specimens of handiwork of various kinds and who were spending a good deal of money on Sloyd, manual training, or mechanical arts as the work is variously called, but I have met very few teachers who had any clear and definite idea of the purpose for which the work was being given, of the methods which would best accomplish that purpose, or of the true possibilities of that form of education.

Studies may be in general divided into three classes: (1) Fact studies—spelling, political geography, and history are primarily of this class. (2) Exercises in reasoning—grammar, mathematics, and formal logic are examples of this class. (3) Exercises in expression—English composition, drawing, and music are examples of this class. Every subject taught in school falls in part or in whole under one or another of these classes, altho it is very seldom that a subject does not belong in greater or less degree to all three of these classes. For instance, altho mechanical drawing is primarily a mode of expression, a good deal of reasoning must be employed in order that the drawing shall correctly represent the desired object. In like manner, a great many facts concerning geometry must be known before a person can correctly represent an object in perspective by freehand drawing or by painting. Similarly, altho political geography is primarily a fact study, there are principles which may be developed and reasoning which may be employed in extending our knowledge of the subject.

We may also classify studies with respect to the objects we desire to accomplish by teaching them. The first of these objects is to teach useful facts. There are certain facts which every person must know if he is to take a useful place in society. A man must know for instance how to spell certain words, what their meanings are, what the common modes of expression are, how to tell time, how to count money and make change, how to reckon, etc. A knowledge of these facts must form the foundation of any sort of education, because we cannot reason, except about facts, nor can we express ourselves except with reference to facts.

The second object is to train the pupil to a quickness of perception of the relations between facts, to deduce the cause from an observed effect, and conversely to deduce the probable effect of something which he observes. This faculty is nothing more or less than what we term common sense, and it should be the purpose of the school to develop common sense by training the pupil to seek and to detect these relations.

The third object of education is to establish certain habits which will be of advantage to the individual, or of social value. Such are habits of observation, of neatness, of accuracy, of attention, of concentration, of diligence, of thoroness, and of cleanliness.

The fourth object of education is to cultivate in the pupil an appreciation of beautiful things, to lead him to find enjoyment in good music, poetry, literature, and art. We increase his store of happiness by teaching him how to find that which is beautiful rather than that which is ugly in those things he finds daily about him. We teach him to find and to value the finest things in human nature. We try to develop a sympathetic appreciation of the feelings and desires of others, and therefore to lead him to desire to be of the maximum social usefulness and to confer upon others the greatest possible measure of happiness.

The fifth and final object of education is so to train the pupil that when he becomes one of the productive units in the economic world his efficiency there shall be a maximum, and society shall receive the largest possible return from his efforts.

I know of no other objects, at least of no other proper objects, which education may have in mind. We must seek for the objects of manual training work among those which I have enumerated. We must not be misled by advantages which are incidental. We must not, for instance, introduce manual training for the purpose of keeping boys in school. If that is our only purpose, we might better let the boys go to work. Nor do I have any patience with those educators who attempt to hide their

ignorance of the objects of manual training work by rattling off a stock of phrases culled from the vocabulary of the psychologist. Manual training ought to be taught for a certain specific purpose. That purpose ought to be so reasonable as to appeal to the man in the street, and whatever the purpose, it can be expressed in such language as to make it clear to the man in the street. Until the teacher does express it in such language, the object is as unreal to him as the subtilties of metaphysics are to the most of us.

INADEQUACY OF SOME ASSIGNED REASONS.

I have studied many schools in which manual training of some kind has been given, and I find that consciously or unconsciously manual training is being given for the following reasons:

In the first place manual training is given because "other schools are giving it and are doing splendid work" or "are getting splendid results." That is, manual training is given in Smithville because the boys in Johnstown are making pretty furniture or have built a dynamo which will actually run an electric light. Now I believe *that* is the poorest of all poor reasons for a change in our educational system. We ought to know whether these splendid results come from added ability or greater happiness in the case of the children trained, or whether they exist only in the minds of the school committee or the proud parents. The fact that some one else is doing it is no reason for the introduction of manual training work.

Secondly, manual training is often given as busy work. It may be used to fill up so much time, to make discipline easier and to keep idle hands out of mischief. If we accept this as the object, it follows that the output of the school should have a maximum economic value, and that the student should be employed upon those things which will be worth the most when they are completed. Since very little of the handiwork produced by these students has any economic value whatever, it follows that either manual training is being wrongly taught, or that it is not a successful form of busy work.

In the third place, manual training is often used as a sugar coating for the pill of education. It may be introduced because it is attractive to many boys, and keeps them in school while their real training and development is coming from the other subjects. They take their physics and chemistry, their Latin and French, their geometry, and their history

in order that they may be permitted two or three times each week to do a little more work upon the hat-rack or dynamo upon which all of their interest is centered. I have already intimated that I do not think much of manual training when this is its primary object.

In the fourth place, manual training is often introduced into schools in order to furnish to manufacturers a supply of labor which is at least partially trained. I know that a very great number of our "principal tax payers" have this idea of the object of manual training. The nature of the equipment which many of our schools have, the avowed intentions of school committees and business men, even many of the arguments used and methods of teaching employed by educators, would indicate that manual training is a partial substitute for the old apprenticeship system. I can see no reason, however, why a certain class of manufacturers should have their workmen trained for them while another class does not have this advantage. Why should we furnish our machine-shops with a supply of partially trained machinists and neglect to furnish our textile mills with partially trained textile workers. Why should we try to educate ten times as many pattern-makers as can possibly be needed, and neglect entirely to supply our housewives with domestic servants. I can see neither right nor reason in training young men for certain special industries to the exclusion of others. Practically all manual training schools train men only in pattern-making, blacksmithing, and machine work. Why should all of the people be taxed for the benefit of a portion of the manufacturers? And why should we turn ten times as many men out as are needed, trained in a certain industry, while other industries find it hard to get intelligent labor? The only result can be to force down wages in those industries in which these men are trained, and I have some suspicion that manual training of this character is so strongly advocated by some of our manufacturing friends because they believe such a reduction in wages to be a "consummation devoutly to be wished."

In the fifth place, many people will tell you that manual training is for the purpose of "coordinating the motor and the higher centers." Just exactly what this phrase means I am unable to say, and I very much doubt if you will find any two men engaged in manual training who will agree as to its meaning. Now I have every respect for the psychologist and particularly for the modern type of psychologist who coordinates his psychology with physiology, and who conducts his researches and develops his theories in the spirit of modern science. To be

of use, however, the theories of any science must be clearly apprehended and intelligently applied, not by a devotee of that science, but by a person engaged in a practical way in the art or profession in which the knowledge is to be utilized. Our steel industry, for instance, must be carried on not by chemists but by engineers who thoroly understand chemistry. Our surveying must be done not by mathematicians but by surveyors who have mastered the necessary parts of the science of mathematics. Our electrical business must be carried on not by physicists but by engineers thoroly trained in all those branches of physics which have any bearing on the nature and use of electricity. In the same way, I firmly believe that our educational work should be carried out by educators who bring to their task all of the resources of phychology rather than by men who are psychologists first and educators afterwards. Education is not a science, it is an art or a profession involving the application of many sciences for the production of practical results. When we bring to our manual training work the spirit of the psychologist rather than that of the educator, we transform it from a method of education into a scientific experiment and thereby destroy the real value of the work.

Not only do I object to approaching the work of manual training in the spirit of the psychologist, but I also object to a psychology which is not in accordance with the actual facts of human nature or the actual construction of the human body. Let us assume for an instant that the purpose of manual training is the coordination of the "motor and the higher centers." The motor centers are those parts of the nervous system which control the movements of the body. The higher centers are those parts of the nervous system in which the process of reasoning occurs. The obvious meaning of the phrase is that the reason and the motion shall harmonize but that neither shall be subordinated to the other. I think, however, that most of us do not have this idea in mind, but rather the idea that the body shall be subservient to the reason and shall perform, in a dextrous and efficient manner, the movements which the reason calls for.

If this is what we are really seeking in manual training, manual training is a mistake. It is based upon a wrong conception of the relation of the motor to the higher centers. Let us suppose a case in point. A child does manual training work for a good many years. He is thoroly instructed in the theory of music. He is able to sing well and has heard many piano performances. Can he play the piano? Not till he has expended days and weeks and months in the practice of certain

particular acts. He must repeat them again and again and again. His manual training has not helped one whit in the process except perhaps to give him a little added muscular strength.

Now there is no question that training in any line of work will bring about this so called coordination in the performance of particular and specific acts. It will not, however, develop any coordination in the performance of other acts, on account of the physical structure of our nervous system, and the nature of nervous and muscular action. If, on the other hand, you are seeking a general improvement in motor accuracy and muscular control, you will have to admit that manual training work is distinctly inferior to many games, to dancing, to well planned exercises, and to many of the feats of skill with which boys naturally amuse themselves.

If I understand at all the meaning of this phrase "coordination of the motor and the higher centers," those who use it believe it is the purpose of manual training to place the muscular movements of the body more surely and accurately within the control of the mind. Its purpose is to shorten the time between the will to move and the movement itself, and to make that movement more direct, more sure, and more precise. If manual training accomplished this in a general way, it would be a most wonderful method of education, but this idea is untenable. It is based upon the assumption that all our useful acts are voluntary in the sense that each movement is directed by the higher centers. Now nothing can be further from the truth than this assumption. When our movements are directed in this way, they are labored, unsure, unskilful, and for economic purposes useless. Movements of this type are perfomed by a child when he takes his first steps, when he is learning to write, when he first begins his piano practice, and when the chisel, the saw, and the hammer are strange and unfamiliar objects in his hand. Movements of this type are made by the beginner and not by the adept. In fact the whole process of training in any handicraft must be directed toward an entirely opposite object. The training must be for the purpose of divorcing the reason and the movement, so that the movement becomes habitual and instinctive, proceeding automatically from the stimulation of the motor centers, and not consciously from the desire of the will. I am therefore compelled to reject entirely this theory of the purpose of manual training. I believe that any system of manual training founded upon it will be essentially faulty and will only result in a waste of the child's time, or worse, in a misdirection of his natural habits and energies.

I have been informed by some teachers that they have a sixth reason. They teach manual training work in order that engineering students may receive advanced credit for it when they reach college. Now I most heartily believe that manual training is a good thing. I believe that reasonable entrance credit should be given for manual training work, but I do not believe that the high school is a proper place for giving advanced technical courses, nor do I believe that the courses usually given are the equivalent of the advanced work of an engineering school. I am compelled to reject this view also.

WHAT MAY BE EXPECTED OF MANUAL TRAINING.

I have outlined what I believe to be the five objects of educational work. If you consider them for a minute, I believe you will agree with me that a man is educated when he has acquired a set of habits that are socially desirable. Accordingly our problem simplifies itself to this: *First,* what are the socially desirable habits that are not fostered sufficiently by the conventional high school curriculum; *Second,* will manual training foster these habits?; *Third,* what form of manual training work must be given, and how must it be taught, in order to foster these habits in the highest degree?; *Fourth,* is there any other system of work or method of education which is superior to manual training for this purpose?

The fundamental defect of the conventional high school curriculum lies in the fact that its attention is devoted exclusively to those things which have little or no connection with our every day life. The conventional curriculum, for instance, attempts to develop a child's reasoning faculties by teaching mathematics. It is more important, however, that he should be trained in the habit of reasoning about his daily work than that he should be trained in the habit of reasoning about geometric problems. The conventional curriculum attempts to develop an appreciation of the beautiful by a study of literature, but it is more important that a girl should be taught to find beauty in the home, in its life, and in its relationships, than that she should be taught to find it in Shakespeare or Schiller. In like manner, it is more important that our boys and girls should learn useful facts about tools, woods, fabrics, food, etc., than that they should be taught the date of the battle of Hastings or the number of l's in parallel. The men originally responsible for our conventional high school curriculum were imbued with the Greek idea

that in order to be noble and worthy of study, knowledge must be dissociated from all its practical relationships, that only those things are worthy of study which have no social value, and that science is degraded when it is made to serve commerce. Of course, in remedying this defect, it is important that we shall not fall into the opposite error, and confuse social value with financial return. Neither must we lose sight of the fact that the maximum of ultimate social value is often incompatible with immediate social return, for education is a long process, and the foundation must be laid broad and deep if a really valuable superstructure is to be erected.

Since the educational theory upon which the conventional high school curriculum is based is essentially wrong, it follows that not only must the methods of teaching be changed in order to comply with the requirements of modern society, but that the curriculum is not sufficient, and must be supplemented by other work. The new curriculum must be based, not upon the erroneous Greek idea of the inherent superiority of abstract knowledge, but upon the modern theory that the purpose of education is to meet a social need.

MANUAL TRAINING AND THINKING.

Unquestionably the most important object which manual training work accomplishes, is to compel the child to think. We think in words, in mental images, and in emotions. Of course manual training work does not give a command of language, and hence does not assist in teaching us to think in terms of words. It does, however, force us to create a mental picture of the thing which we desire to make, which is an even more important method of thought. It does more than that, however. It compels the thought to be definite and complete. Most people have only hazy and indefinite images about things which ought to be clear cut and exact. For instance they think of a table as consisting of only five pieces of wood, a top and four legs, and the sizes of these parts are in most cases very indefinite. So long as the mental image has a superficial and elusive resemblance to what they are attempting to picture, they are satisfied. Since they are unable to create for themselves a definite and clear cut conception, their thoughts are hazy and useless. They no more resemble the type of mental image which one must have before real thought becomes possible than an impressionist picture resembles a photograph. When properly carried on, manual training absolutely forces the

pupil to imagine something for himself. It forces him to make his image so definite and clear cut that a model can be made of it. If the gaining of this power of visualizing something, and of imagining operations performed upon the vision, were the only benefit conferred by manual training, it would even then be one of the most valuable studies which we have. There are many other socially desirable habits which manual training develops. Habits may be mental as well as physical. The laws of mental habit are very similar to those of physical habit. To illustrate to you one of the laws of physical habit, I would call to your attention the fact that we cannot develop an expert typewritist by daily practice upon the piano. The same law holds with mental habits. We cannot develop in a child the ability to reason about the things of daily life, by practice in solving problems in algebra. The purpose of manual training then is to get the child to reason about the common every day things; to develop in him habits of industry with respect to manual work; to make him neat and orderly in the things which he does; to make him appreciate excellence of workmanship; and to bring him to a realizing sense of the value of labor and the possibilties which intelligently applied labor may accomplish.

Within the time at my disposal, I cannot begin to point out to you all of the educational objects which may be accomplished by manual training work. I must leave them for you to study by yourselves. I want to remind you, however, that in doing so you must get down to fundamentals. You must discover first the desirable characteristics which you intend to develop. Then you must analyze these characteristics, determining the items of knowledge, and the physical and mental habit elements which constitute them. When you have determined these habit elements you must devise some kind of work which will form them by exercise. When the desired elements become habits thru exercise, the characteristic is fixed. And in all your work, you must be careful that it is so devised that in forming good habits you do not also form bad ones.

Many of the educational methods which we adopt in order to bring about certain results, are not successful because they are not properly devised. Any characteristic which is a complex of several habits cannot be successfully fixed by insisting upon the characteristic itself. It must be fixed by developing the several habits which form the characteristic. To take an example from athletics, we cannot develop a high jumper by commanding the man to jump high, by insisting that he do it, and by re-

quiring him to attempt to do it again and again. Instead we must make a study of the positions which a man must assume, of the motions which he must go thru, and of the efforts which he must make in order to jump high, and then we carefully train the man in each of these elements. When perfection in the several elements is achieved, and not till then, the man becomes a high jumper.

IMPORTANCE OF RIGHT METHODS.

After we have grasped the fundamental needs which our conventional curriculum does not meet, and which may be met by the introduction of manual training, we must attack the problem of how we shall conduct our manual training work in order to accomplish what we desire. I believe that the best method of manual training is first to teach the pupil the uses of the tools employed, and then as soon as possible, to compel the pupil to originate his own designs. Before a bit of work is done, a perspective sketch, a detail drawing, a bill of material, a list of the tools needed, and an outline of the operations to be performed, their sequence, and the method proposed for their performance, ought to be required. The work will then proceed in an orderly and effective manner. Good workmanship should be insisted upon, and every facility should be provided for securing it. Proper tools properly sharpened, good stock, and constant supervision and suggestion are necessary. The pupil should be encouraged to believe that what he is making is a thing of beauty and value, and he should have it for his own, or be paid for it, when it is done.

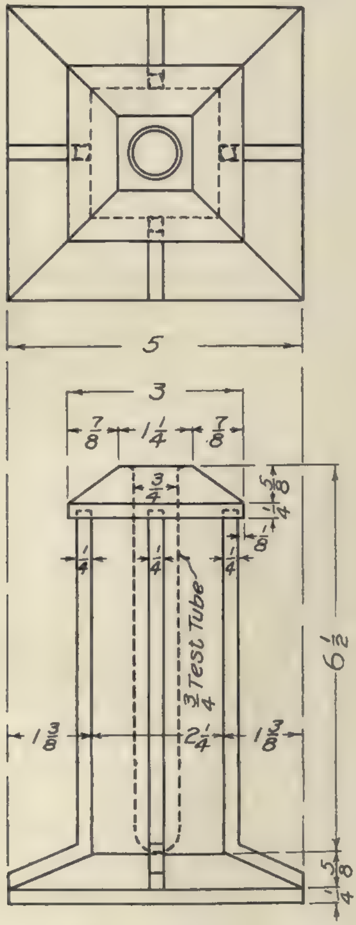
Always we must keep it in mind that we must inspire the pupil with a vision of the possibilities of his work. He must feel not only that labor is necessary and therefore honorable, but that it is a pleasure. He must feel the thrill of accomplishment, and realize that knowledge, imagination, and labor, are the threefold keys to all the treasures of the world.

Is the manual training which you are giving being done in this spirit? Is it accomplishing the results which are possible, (I mean the educational result, and not the piece of work), or is your manual training of the type which I have seen more than once in a state whose name I will not mention? I have seen boys given pieces of drygoods box full of knots, nail holes, and shakes in order that they might make with a jack-knife, possibly supplemented by a few dull chisels, some-

thing which had neither beauty nor utility; compelled because they lacked the manual skill to use poor tools and their school committee lacked the breadth of vision to give them good tools, to spend untold hours in doing tasks that could be accomplished in a few minutes. I have heard of boys who labored for eight or ten weeks, three and four hours every week, in whittling out a smooth round wooden cylinder 12 inches long and 1 inch in diameter. When it was done, it was good only for kindling wood, and the boys knew it. Does that sort of work accomplish the thing we desire? Is it a useful form of education? Does it open before the pupil an endless vista of the possibilities of beauty and utility which lie within the combined power of knowledge, of imagination, and of labor? Does it perfect him in a useful habit? Does it give him the satisfaction of work well done and of reasonable accomplishment? Does it compel him to exercise his imagination, to devise ways and means of accomplishing some valuable result? Does it develop in him habits of industry, of observation, of thoroness? No, you know it does not. The kind of work taught under the guise of manual training in some of our schools is a wicked waste of time. The children might far better be playing in the school yard, under the direction of the teacher. Why teach the pupil absurd and ridiculous methods of accomplishing work? Why teach him methods so crude and primitive that even the veriest savage could improve them? Why allow him to make something unbeautiful and useless; a thing in the possession of which he will have no joy, when he might out of the rich stores of his imagination draw forms of beauty and utility which would be to him a source of inspiration and delight all his life? Why make a poor coat-hanger out of the top of a drygoods box, or a pencil-rack from something rescued from the kindling wood, when he might make a tool box or a table from beautiful wood, beautifully finished?

I wish I had both the time and the words to give you an idea of the possibilities that I see in manual training, and I wish I had the ability to make you feel the tremendous loss in potential educational training which wrong methods bring about. Until you get down to the fundamentals of education; until you learn what the very elements are that build up the characteristics we are striving to develop; until you learn the effect of every method employed upon these elements; until you realize the finest possibilities lying open to you; your manual training will not be what it should be. Stop doing the things that the other fellow does. Begin to seek for yourselves the things that you

ought to do and remember that the precious opportunities are not yours but the child's, and that he does not control them, but that you hold them in trust, and that it is your sacred duty to make the most of them for his sake.



ROSE HOLDER

BY LEWIS D. COONER, SHARPSBURG, PA.

PROBLEMS IN ELECTRIC BELL AND LIGHT WIRING.

THOMAS W. JOHNSTON.

INTRODUCTION.

THE following outline is the first of two articles on bell wiring and exposed electric light wiring. This outline for bell wiring is taken from the general course in electricity given at the two elementary industrial schools in the city of Pittsburgh, Pa. These two schools are known as the North Industrial School and the Irwin Avenue Industrial School; and the writer is giving the outline of the course as it is used in the latter.

The general course was planned for and given to boys of at least fourteen years of age, who could put in from 6 to 9 hours per week in shopwork in any special line.

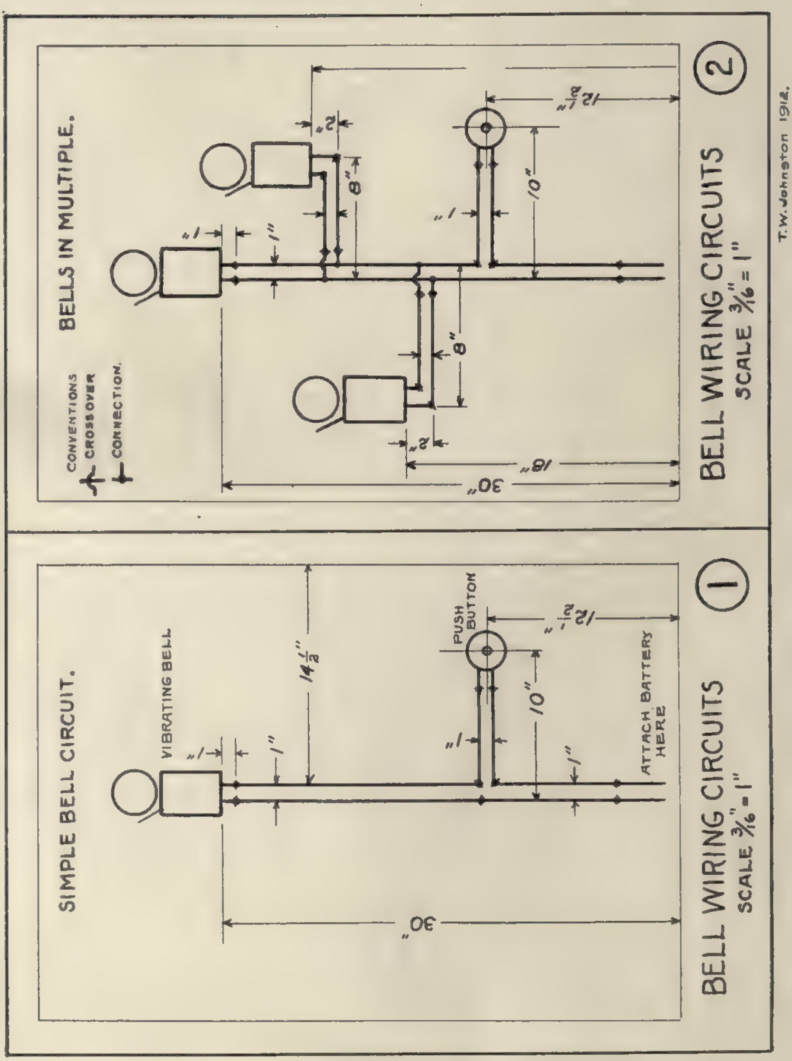
The bell and light wiring is done on panel boards placed in frames about two feet from the floor, making it convenient for the boys to do their work, and each boy has a panel for his own individual use.

In all the work everything that is used is the same as might be found on a real job, and the work is carried out as nearly as possible like the work on an actual job. In some cases the construction is changed slightly to help the boy to better understand what he is doing. For instance, in several of the bell problems the wires are run one inch apart, which is not done in actual practice when the wires are exposed; but done here so that the boy can trace the circuit more easily.

While the purpose of the industrial school is not to teach a trade, at the same time the work is made as practical as possible to help the boy to better understand the theory and in order that if he should enter the trade he may be that much better fitted for it.

The bell wiring course consists of ten problems. In each problem the boy is required to figure the amount of material needed from a blueprint, and make out an order for these materials. This order is kept on file to show what he has received and to re-check materials returned. Each drawing or blueprint is furnished the boy with the exception of the last; this being worked out entirely by himself.

With the shopwork, lessons and lectures are given on wire, fasteners, such as insulating staples, bells, batteries, etc.


SIMPLE BELL CIRCUIT.
VIBRATING BELL
PUSH BUTTON
ATTACH BATTERY HERE
BELL WIRING CIRCUITS
SCALE 3/16" = 1"
1
BELLS IN MULTIPLE.
CONVENTIONS
CROSSOVER
CONNECTION.
BELL WIRING CIRCUITS
SCALE 3/16" = 1"
2
T. W. Johnston 1912.

PROBLEM NO. 1.

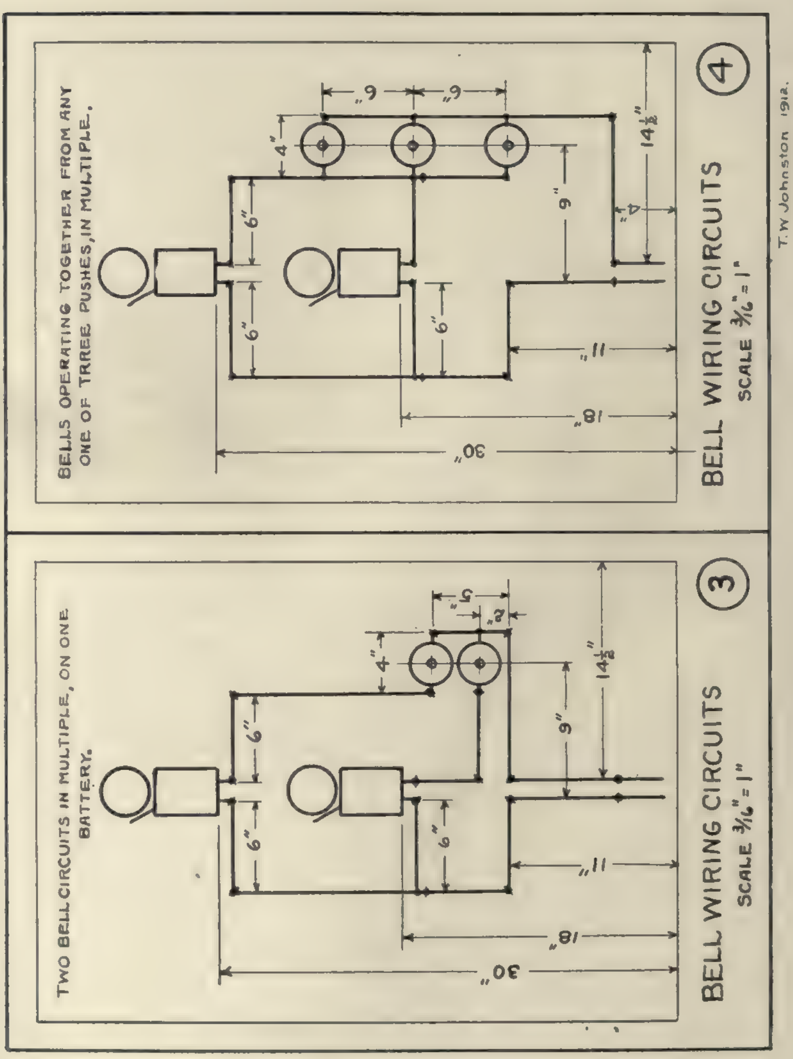
This problem is to illustrate the installation of a bell, such as is found in most homes. This is the simplest kind of bell circuit, but it lays the foundation for all circuits that follow. Each part is arranged to conform as nearly as possible to the conditions usually found in the house—the bell up the highest, the push button at one side, illustrating or representing the front door, and the position for the batteries, the basement, for this is the usual place for the battery, altho not always the best. A cool dry place is the proper place for the battery regardless of its position in the house.

After the bell, wire, and push button are in place the battery is connected. The battery consists of two cells connected in series, which means that the carbon of one is connected to the zinc of the other; the other two terminals being connected to the ends of the wires, one leading to the bell and the other to the push button. The push is now pressed and the bell adjusted to ring the best with that particular battery. If everything is in satisfactory condition the pupil is ready for the next exercise.

PROBLEM NO. 2.

This problem illustrates the connecting of several bells so that they can be operated all at the same time from one push—"push" is the term used commonly for push button. All the pupil is required to do here is to connect properly two additional bells to the circuit he had in problem No. 1. The two additional circuits are so connected that one side of each bell is connected to the battery and the other is connected to the push. Such circuits are called branch circuits and the bells are connected in what is called parallel or multiple. Here the current from the battery has three paths in its trip from the one side of the battery thru the bells and push back to the other side of the battery. It is best to have all the bells the same when connected in this way as then each bell will take the same amount of current and each bell ring with the same force.

After the test, the entire wiring, bells, and push are taken down, as the next exercise is quite different.


BELLS OPERATING TOGETHER FROM ANY ONE OF TRREE PUSHES, IN MULTIPLE.
BELL WIRING CIRCUITS
SCALE 3/16" = 1"
4
T. W. Johnston 1912.
TWO BELL CIRCUITS IN MULTIPLE, ON ONE BATTERY.
BELL WIRING CIRCUITS
SCALE 3/16" = 1"
3

PROBLEM NO. 3.

This problem is to illustrate the connections of two bells, two pushes, and one battery; as found in a two story building where different families live on each floor and each has a push at the front door to operate its bell. In this case each bell, with its corresponding push, is arranged in multiple with the other; in fact, we have two simple bell circuits connected in multiple. One battery is used to save expense.

The usual test is made in this exercise, after which part of the wiring is left up for the next problem.

PROBLEM NO. 4.

This is simply making a few changes in problem No. 3 to show how the same two bells can be made to ring at the same time from several different points. Here we have the two bells connected in multiple, and the three pushes connected in multiple, and the bells as usual in series with the pushes; that is, the current can get thru the bells by means of any one of the pushes. Conditions often arise where such connections are necessary; in fact, this circuit is similar to the bell system used in the school building where these exercises were worked out.

The usual test is made with the battery.

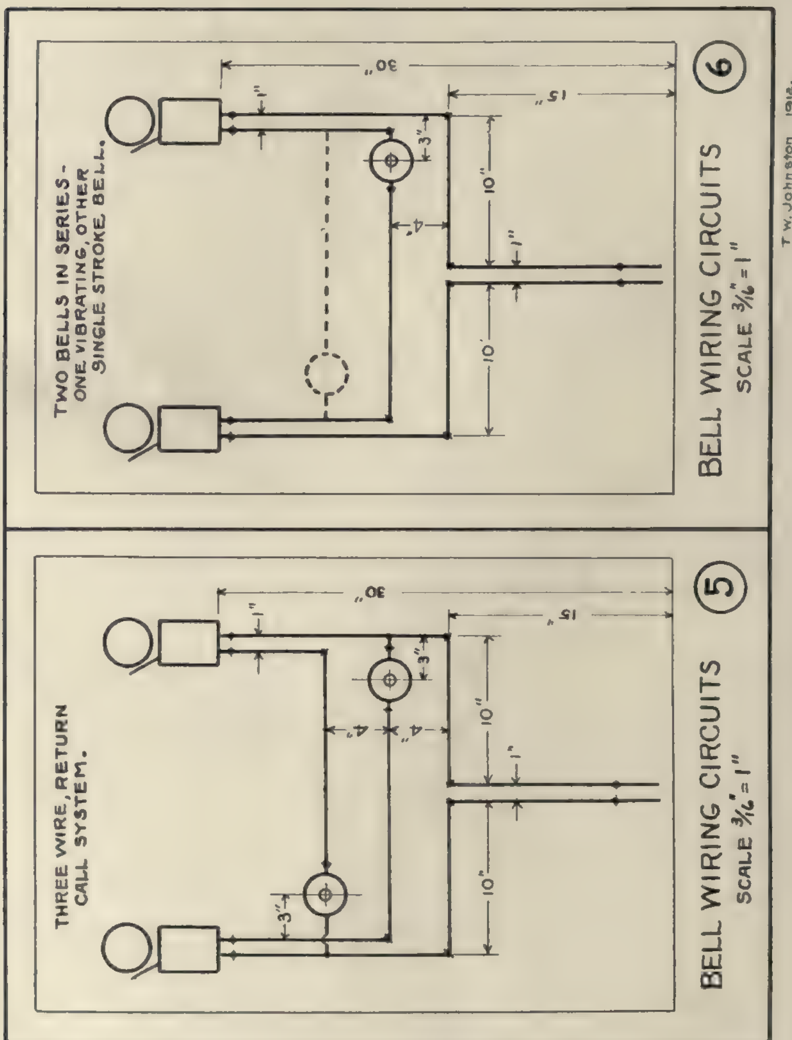
PROBLEM NO. 5.

It is quite common to find a call bell system where a person in one room or building can call another person in another room or building, and be sure that the other person gets the call as the second person can answer or return the call. So we have the return call system. Now this can be done by means of two separate bell circuits, but if connected as shown on the drawing one wire can be saved. As in any simple bell circuit one side of the battery is connected to each bell, and one side of the battery is connected to each push.

The usual test is made, and part of the wire left up for the next exercise.

PROBLEM NO. 6.

It is often necessary to have a bell so connected so that one may


TWO BELLS IN SERIES - ONE VIBRATING, OTHER SINGLE STROKE BELL.
BELL WIRING CIRCUITS
SCALE 3/16" = 1"
6
THREE WIRE, RETURN CALL SYSTEM.
BELL WIRING CIRCUITS
SCALE 3/16" = 1"
5
T. W. Johnston 1912.

know positively that it rings when the push is pressed. This can be done by arranging two bells in series. By placing in series it means that they are so connected that the current in flowing from the battery must pass thru both bells before returning to the battery. For two bells to operate satisfactorily connected in series, one must be a single stroke bell—that is, one that has no circuit breaker and makes only one stroke every time the push is pressed. When connected in series with a vibrating bell the single stroke bell also vibrates as the vibrating bell breaks the circuit every time it makes a stroke, so the single stroke bell will act much like a vibrating bell.

In making the test with battery on this exercise, a battery of four cells connected in series is used. The reason for this is that since the current is compelled to pass thru both bells before it can return to the battery, it will require more force to cause the current to flow. If the two bells are of the same resistance it will take exactly twice as much force, so we use a battery of twice the voltage, which means force.

The additional wire and push shown in dotted lines is another push in parallel with the first. This part is optional.

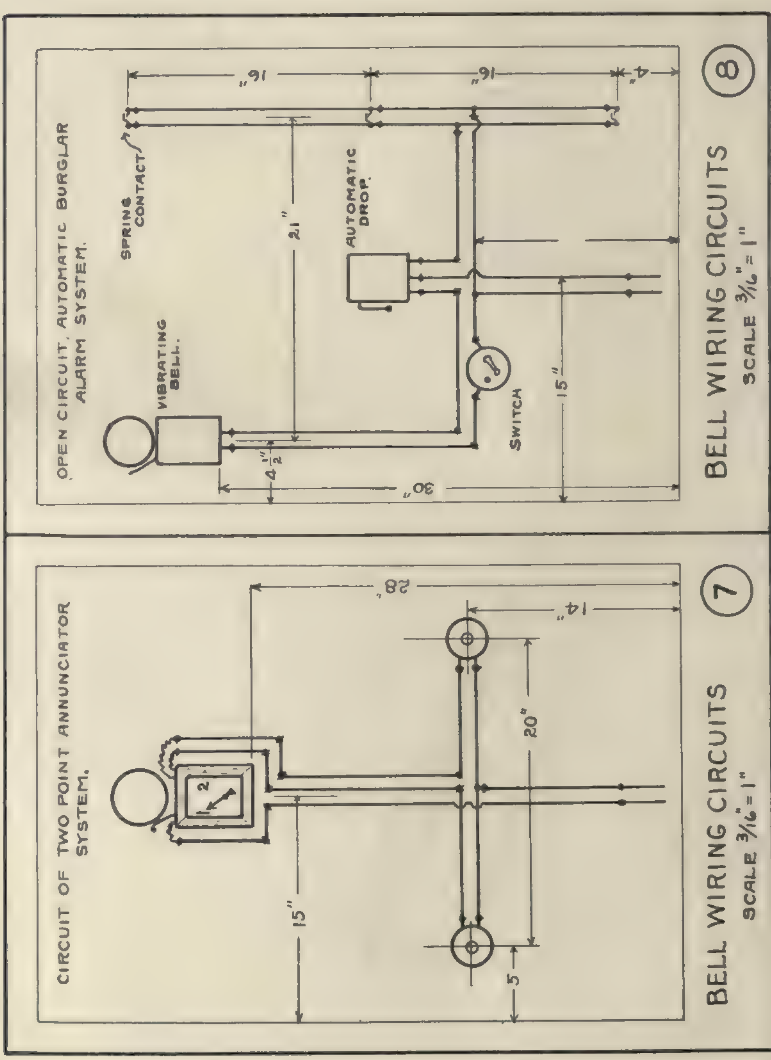
PROBLEM NO. 7.

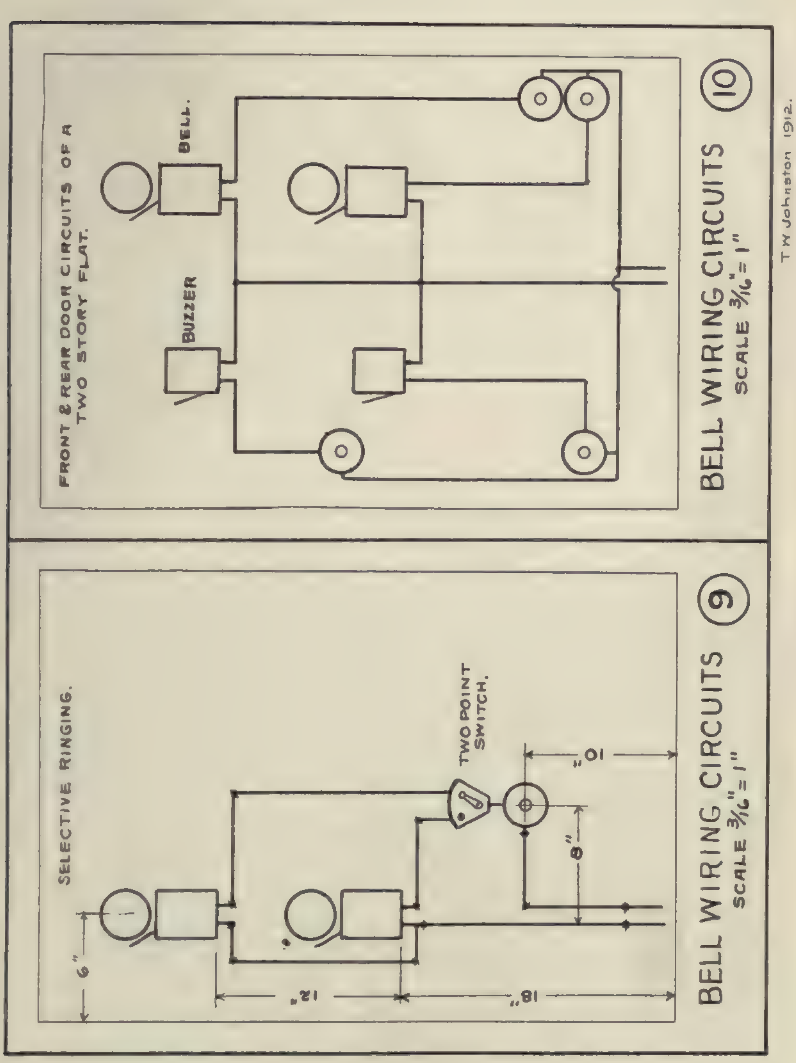
This problem is the connecting up of a two point annunciator or indicating bell. This bell is so made that when the current passes thru it, causing it to ring, it also must pass thru a coil which acts as a magnet to throw a pointer toward a number, this number indicating where the call came from. A bell of this kind may have any number of these extra coils, but the one used here has only two since it gives the principle of the device as well as a more complicated one would. One wire from the battery goes to the bell, and the other goes to each of the two pushes. Each push is connected to one of the coils in the annunciator.

The exercise is tested with battery in usual manner.

PROBLEM NO. 8.

There are many different kinds of burglar alarm systems which may come under one of the following three heads: open circuit, closed circuit, and a combination of these two systems. The one shown in problem No. 8 is of the first type—the open circuit system. This system is one where the battery is in use only when the alarm is in actual


OPEN CIRCUIT, AUTOMATIC BURGLAR ALARM SYSTEM.
SPRING CONTACT
VIBRATING BELL.
AUTOMATIC DROP.
SWITCH
16"
16"
4"
21"
4 1/2"
15"
30"
BELL WIRING CIRCUITS
SCALE 3/16" = 1"
8
T. W. Johnston 1912
CIRCUIT OF TWO POINT ANNUNCIATOR SYSTEM.
2
28"
14"
20"
15"
5
BELL WIRING CIRCUITS
SCALE 3/16" = 1"
7


FRONT & REAR DOOR CIRCUITS OF A TWO STORY FLAT.
BELL.
BUZZER
BELL WIRING CIRCUITS
SCALE 3/16" = 1"
10
T W Johnston 1912.
SELECTIVE RINGING.
TWO POINT SWITCH.
6"
12"
18"
8"
10"
BELL WIRING CIRCUITS
SCALE 3/16" = 1"
9

operation, so we may use a dry battery, which is intended for intermittent use only.

There are two distinct circuits in this system, one the bell circuit, and the other the automatic drop circuit. When any one of the spring contacts is pressed together it closes the circuit thru the drop which automatically closes the other circuit thru the bell causing it to ring continuously until shut off by resetting the drop or opening the switch on the bell circuit.

The spring contacts may be placed under the carpet, in windows, in doors, or any place where they are likely to be tampered with unconsciously by an intruder.

The test for this exercise is to press all the springs to see that each separately works correctly. Then one is pressed and after the bell starts to ring the wires on the drop circuit are cut to show that such cutting of wires, which an intruder would be likely to do, would not have any effect upon the ringing of the bell. The bell can be stopped only by opening the switch intended for that purpose, or by resetting the automatic drop. The bell, switch, and drop can all be placed where no one could have access to them except the owner of the house.

PROBLEM NO. 9.

This problem illustrates the use of a selective switch. Either bell can be caused to ring at will by setting the switch before pressing the button so that the current will have to flow to whichever bell the switch is connected to. The switch in this exercise has only two contacts and is called a two point switch as it can be used to select between two separate bells.

The usual test with battery is made.

PROBLEM NO. 10.

This problem illustrates the connections required in wiring a two story flat, with pushes at front door (first floor) for front door bells on each floor, and back door pushes on each floor for buzzers on each floor.

The diagram given here was copied from one made by one of the boys in the class. He endeavored to place everything relatively in the positions occupied in a real building. Also he arranged the different

ELECTRIC LIGHT WIRING ON ONE OF THE PANELS AND WORKTABLE ON WHICH IS A SMALL NICKEL PLATING OUTFIT USED BY THE CLASSES.

ANOTHER VIEW OF THE SAME ROOM SHOWING ELECTRIC LIGHT WIRING AND SOME BELL WIRING AND APPARATUS. A RECTIFIER, USED TO TRANSFORM ALTERNATING CURRENT INTO DIRECT CURRENT, IS MADE UP OF FOUR JARS (ON TABLE IN CENTER) AND IS CHEMICALLY OPERATED.

circuits to save the most wire, and all to operate from one battery.

The usual test is made with battery.

In all these problems after the first two, the boy is given his choice about running the wires separated one inch, as on the diagrams, or close together. In most cases it is found more satisfactory to run the wires as given on diagram as it is much easier to trace trouble when it occurs. And trouble often occurs as the boys are given defective apparatus purposely, and often the instructor cuts wires without the pupils knowing it. This was done to give them a chance to find the trouble. Locating trouble in a scientific manner is often worth more than knowing how to put the apparatus up.

Thruout this work practicability is the slogan.

MAGAZINE RACK MADE IN JOHN MARSHALL HIGH SCHOOL, RICHMOND, VA.

THE MANUAL LABOR MOVEMENT IN THE UNITED STATES.[1]

HERBERT G. LULL.

THE manual labor movement in the United States began about eighty-three years ago (1830) and lapsed about sixty-eight years ago (1845). This movement is interesting because of the light it throws upon the different phases of vocational education of the present time. There had been a few instances of successful attempts in combining manual labor of one kind or another with instruction even from the earliest days in the colonies. But this duty was for the most part performed by the home. The manual labor movement to be discussed in this paper, however, was distinctively a secondary and higher school movement, and it was the first thorogoing trial of the manual labor idea of instruction in the United States. The movement suddenly assumed large proportions about 1830 and ceased to exist almost as suddenly from ten to fifteen years later. Its failure was due to many causes, chief among which were the following: first, there was no insistent social demand for manual labor instruction; second, the notions of the values of manual labor in relation to literary instruction were in error; and third, the labor performed by students could not be made a financial success.

Like many another educational movement, the chief inspiration establishing the manual labor movement came to the United States from Europe. The movement originated with the so-called DeFellenberg schools at Hofwyl, Switzerland, about 1805. Two years later the first building was erected for the "Literary Institution," a school for the children of the patrician families. In 1808, Fellenberg organized the "Agricultural Institution" or "Poor School." Agriculture was to afford the means for the livelihood and the moral education of the poor. About this time a school of "Theoretical and Practical Agriculture" for all classes was formed, equipped, and provided with professors. Fellenberg also began his normal school in 1808. In 1823, a school for poor girls was erected, and in 1827, the "Intermediate or Practical School," de-

[1] I wish to acknowledge my indebtedness in the preparation of this paper to Dr. Richard Gause Boone, Professor of Education of the University of California, who suggested the topic. His books, "Education in Indiana," and "Education in the United States," have been invaluable sources in furnishing a list of manual labor schools as well as interpretations of the movement.

signed for the children of the middle classes of Switzerland was organized.[2]

EDUCATIONAL PRINCIPLES.

Fellenberg's principles of education were essentially those of Pestalozzi with perhaps an additional emphasis placed on the educational value of activities. They may be summarized as follows: first, all the faculties of the mind should be developed harmoniously; second, when a new pupil is to be received for instruction, a teacher should secure an accurate knowledge of his individual character—all its resources and defects; third, the child is not to be a mere receptacle of ill-digested knowledge, and the teacher must "endeavor to cultivate conscience, the understanding and the judgment"; fourth, "a great variety of exercises of the body and senses" should be "employed to prepare the pupils for the fulfillment of their destination. All the various relations of space should be presented to the eye." "Instruction in design and the cultivation of the ear by means of vocal and instrumental music" should be provided. Opportunity for systematic observation of natural objects should be provided; fifth, "the social life of the pupils should be made to contribute to the formation of moral character;" sixth, "their religious education should be kept in mind in every branch of study"; seventh, "We occupy the pupils' attention according to their individual necessities and capacities, with philology, the ancient and modern languages, the mathematics and their various modes of application, and a course of historical studies comprising geography statistics, and political economy." Eighth, Fellenberg " was not in favor of artificial incentives or emulation and the fear of punishment."[3]

The following description of Fellenberg's methods of training teachers for industrial work seems very much like that of present day industrial training schools: "In the morning, the hours from five to seven and from eight to twelve were devoted to lessons. In the afternoons the teachers worked in the fields and in the garden. In the evening they prepared the vegetables for the next day's meals. During the harvest they assisted in the fields during the whole day. * * * He gave them * * * every evening a lesson in agriculture in which he ex-

[2] American Journal of Education, 1857, Vol. 3, p. 591.

[3] Quotations from William DeFellenberg. See American Journal of Education, 1857, Vol. 3, p. 591 ff.

plained the various field operations and their connection. He conversed with them on the subject of making agricultural labor a valuable aid in education and a subject of instruction for boys. Each evening he talked over with them the labors of the following day." Andrew Bell of Monitorial School fame gave an interesting description of Fellenberg's school for the poor from which the following sentences are taken: "His school for the poor consists of thirty-two boys who work about two hours and study two. They are chiefly employed in agricultural labor; sometimes in mechanical work. They learn reading, writing, ciphering, drawing, music, and the elements of geometry. Music and drawing (designing) are in great request in their schools, and also geometry. The new school has but one master (Verhli) of distinguished merit." The excellency of this school "consists * * * of a single point, which is not much noticed. Every class, and every scholar, has his master always at his side, whether at study, work, or play."[4]

The Fellenberg schools at Hofwyl possess the essential characteristics of the broad gage industrial schools of the United States of the present time. By essential characteristics is not meant buildings, equipment, and developed technic, but educational values, motives, and fundamental methods. With the exception of the school for the children of the "patrician" class the schools at Hofwyl were designed to prepare the pupils for their present and future life work. Manual labor for the "patrician" class was intended to broaden their sympathies for humanity. Manual labor was to develop the pupils' mental powers, for said Fellenberg, "what has been done, and done with thought, will be retained more firmly by the memory, and will bring a surer experience than that which has only been seen or heard." But the disciplinary value was not detached from life's work and life's interests. Manual labor loses its disciplinary value when it becomes drudgery. Manual labor was to induce health of body and mind, and for this purpose, joy and interest in the work and outlook for the work were essential factors of success. Fellenberg held that manual labor should lay the foundation for and be intimately related to the larger social interests of life, economics, politics, religion.

The institutions at Hofwyl continued to exist and flourish until 1848, two years after the death of the great educator and philanthropist. At this time his family discontinued all the schools except the "School for

[4] American Journal of Education, 1861, Vol. 10, pp. 487, 488.

the Poor," which was still in operation as late as 1857. How much longer or whether it still exists the writer is not informed. The principles of education developed and applied by Fellenberg have been widely adopted in his native country, in Europe, and in the United States.[5]

"The first president of Dartmouth College, Doctor Wheelock, admonished his students in 1771, two years after the college was opened, 'to turn the course of their diversions and exercises for their health to the practice of some manual arts, or cultivation of gardens and other lands, at the proper hours of leisure and intermission from studies and vacancies' (i. e. vacations)."[6]

As early as 1790, Dr. Benjamin Rush, of Philadelphia, advocated agricultural and mechanical pursuits in educational institutions; and in 1796, the first manual labor school was founded in Abbeyville county, S. C.[7]

EARLIEST SCHOOLS IN UNITED STATES.

However, the great interest in the idea of combining manual labor with study in seminaries and colleges was largely inspired by the successes of the Fellenberg manual labor schools at Hofwyl. The Gardiner Lyceum Manual Labor School of Maine was founded in 1823. Then followed the founding of the Fellenberg School at Windsor, Connecticut, in 1824, and in the same year one at Derby, Connecticut, and one at New Harmony, Indiana; the Maine Wesleyan Seminary at Augusta, 1825; the Oneida Institute of Science and Industry, at Whitesboro, New York, 1825-26, which became a very successful manual labor school; the Mechanical Association at Andover Theological Seminary, Massachusetts, 1826; Kenyon College, O., and Waterville College (later Colby College), Maine, both with manual labor departments, 1827; the Genesee Manual Labor School, and the Yates Polytechnic, of New York, before 1830. "This movement came in when the gymnastic movement began to wane." The "idea became strong with the belief that the solution of the whole problem of physical exercise in the educational institutions was found."[8]

[5] American Journal of Education, 1857, Vol. 3, p. 596.

[6] Special report of the Bureau of Education. Educational Exhibits and Conventions, New Orleans, 1884-85. Part 1, p. 426.

[7] Circulars of information of the United States Bureau of Education, No. 4, p. 51.

[8] Report of the United States Commissioner of Education, 1891-92, Vol. 1, page 506.

But the substitution of manual labor for gymnastics as we shall see was not successful. Even the boys preparing for the ministry required the joy of free activities, at least as free as that offered by gymnastics. One must infer after examining the evidence that the majority of the promoters of the manual labor movement missed the essential principles of the movement as it developed at Hofwyl by being all too eager to banish play and substitute a regimen of vigorous and sober discipline. Something of the early Puritan asceticism seems to have been in evidence. Dr. Benjamin Rush, above mentioned, is credited with commending "the Methodists for 'wisely banishing every species of play from their college' and that the experiment had been tried, 'with the happiest effects, of introducing the care of vegetable gardens as an amusement' in the Methodist College at Abington in Maryland. He also says that all the amusements of the children of the Moravians at Bethlehem, Pennsylvania, 'are derived from their performing the subordinate parts of several of the mechanical arts; and that a considerable portion of the wealth of that worthy and happy society is the product of the labor of their little hands.' "[9]

ORGANIZED PROPAGANDA.

By 1829 the manual labor movement was growing rapidly. At this time Dr. Stephen H. Tyng of Philadelphia and Dr. Elias Cornelius, editor of the "American Quarterly Register" and secretary of the American Education Society, were effectively championing the cause of manual labor. In 1831, the "Society for Promoting Manual Labor in Literary Institutions" was organized in New York, for the purpose of collecting and diffusing information designed to promote the establishment of manual labor schools and seminaries in the United States, and for introducing the system into institutions already established. The system was to be introduced without reducing the quantity or quality of the literary and scientific work. On the contrary, thru the invigorating influence of manual labor on body and mind the standards of literary and scientific attainment were to be raised.

"Mr. Theodore D. Weld, who became secretary of the 'Society for Promoting Manual Labor and Literary Institutions,' visited most of the large towns and leading literary institutions in Ohio, Indiana, Illinois, Missouri, Kentucky, Tennessee, and Alabama, prosecuting his inquiries

[9] Special Report of the Bureau of Education. Educational Exhibits and Conventions, New Orleans, 1884-85, Part 1, p. 427.

and calling public attention to the manual labor system by public lectures and private conferences with the managers of the institutions visited. Wherever he went he was well received, and his labors resulted in a great increase in public interest in bodily exercise in general and manual labor in particular."[10]

Mr. Weld's first report brought out the following points:

1. The present system of education makes fearful havoc of health and life.
2. The present system of education effeminates the mind.
3. The present system of education is perilous to morals.
4. The present system of education produces an indisposition to effort and destroys habits of activity and industry.
5. The present system of education is so expensive that its practical effects are anti-republican.

He reached the following conclusions:

1. Bodily exercise is indispensable to man from the necessities of his corporeal, intellectual, and moral nature, his individual happiness and social usefulness.
2. This exercise should be incorporated into our system of education and alternated with study in all seminaries of learning.

Still further he concluded:

1. This exercise must be taken daily.
2. The student should spend at least three hours daily in exercise.
3. The exercise should be moderate.

And then he criticizes the gymnastics of the time as:

1. Dangerous; too violent for persons leading sedentary lives.
2. Unnatural; many of the movements required are such as are rarely demanded by human circumstances.
3. Unphilosophical; no visible effects are witnessed, and the production of manifest effects is a main element of interest in muscular movement.
4. Gymnastic exercise excites aversion in the public mind. Leave wooden bars to children and monkey tricks to monkeys.

The author of the report finds manual labor to be a panacea for all the ills above described because:

1. The manual labor system furnishes exercise natural to man.
2. It furnishes exercise adapted to interest the mind.
3. Its moral effects would be peculiarly happy.
4. It would furnish the student with important practical acquisitions.
5. It would promote habits of industry.
6. It would promote independence of character.
7. It would promote originality.

[10] Report of United States Commissioner of Education, 1891-92, Vol. 1, pp. 507-508.

8. It is adapted to render permanent all the manlier features of character.

9. It would afford facilities to the student in acquiring a knowledge of human nature.

10. It would greatly diminish the expense of education.

11. It would increase the wealth of the country.

12. It would do away with those absurd distinctions in society which make the occupation of an individual the standard of his worth.

13. It would have a tendency to render permanent our republican institions. [11]

At the third annual meeting of the American Lyceum, 1833, the association passed resolutions favoring manual labor schools. Three of the five resolutions are as follows:

1. No system of education is complete which does not provide for the vigor of the body, as well as the cultivation of the mind, and the purity of the heart.

2. The combination of manual labor with study is not only important as the means of promoting health, but is also calculated to invigorate the mind for intellectual labor, and to aid in regulating the feelings and restraining the passions of youth which are so often excited by a sedentary life.

3. That the acquisition of some mechanical employment in early life is desirable to every individual, as a means of relaxation and health, as a resource in case of difficulty, and especially as a means of rendering labor respectable in the eyes of all, and of promoting mutual regard and sympathy between the different portions of society in a republican government.[12]

The manual labor movement lies within the period of the introduction of the American public high school. The high schools originated in response to democratic motives. There was a growing opinion that the seminaries, fitting schools, and finishing schools of the time were aristocratic. The manual labor movement was in part an attempt to check the growth of that opinion, and to correct the aristocratic tendency wherever it existed.

Before considering the question farther it will be profitable to read some of the accounts of a few of the typical manual labor schools.

MANUAL LABOR DEPARTMENT OF WATERVILLE COLLEGE, 1830-1842.

In 1827 the trustees of Waterville College, now Colby College, Maine, voted

"that it is expedient to have a convenient mechanics' shop erected on the college lot, at which students as are disposed may employ themselves a small portion of the day in such work as may yield them some profit." In 1830 the shop was

[11] Report of United States Commissioner of Education, 1891-92, Vol. 1, p. 509.

[12] American Journal of Education, 1864, Vol. 14, p. 544.

built chiefly by the hands of the students. * * * A second and larger shop was erected by the students soon after. Three hours a day were assigned for labor, the work being made ready by the superintendent. The articles manufactured were chiefly doors, blinds, sashes, bedsteads, tables, chairs, and boxes. The organization of the work was such that each student had his special labor—sawing, planing, mortising, grinding tools, etc. In 1832 the members of the department built the large boarding house, long known as the "Commons House." * * * A third shop was added soon after, and carriage making and painting attempted. In 1835, there being no printer in Waterville, a printing office was started in one of the shops. It was supplied with a valuable press, the gift of a manufacturer, and placed in charge of Edgar H. Gray, class of 1838, who had learned the trade of printer. A variety of job work, the annual catalogs, and a 34-page catalog of the library were issued from the "College Press." * * * Students were employed in 1836 in preparing the lumber and in mason work for the college chapel, now Champlin Hall, and for three professors' houses. Three shops were fully occupied at this time, the students earning from fifty cents to two dollars and fifty cents per week. At the accession of Dr. Pattison to the presidency in 1836, it was found that several thousand dollars had been sunk in the manual labor experiment.

The want of success may, without doubt, be mainly referred to the fact that the larger number of student workmen possessed little skill and produced inferior work. * * * But on the other hand, it attracted many students to the college and added a class of young men most valuable to the world by reason of the qualities developed in their struggle to obtain an education. The list of laborers in the shops bears the names of many of the most honored sons of the institution; men of energy, ability and culture, including those of two college presidents.[13]

MANUAL LABOR AND THEOLOGICAL INSTITUTE, EATONTON, GEORGIA, 1833-44.

At the annual convention of the Georgia Baptists in 1831, it was decided to establish "in some central part of the state as soon as funds should justify it, a classical and theological school, which would unite agricultural labor with study and be open for those only preparing for the ministry." Accordingly in 1832 the school was established at Eatonton. "In December, 1844, the manual labor system, which had been on trial since the foundation of the institute in 1831, was abandoned, having proved to be inefficacious. Several other attempts had been made during the same decade to establish manual labor schools in different places, which, with one exception, had likewise failed. The country was not yet ready for the introduction of that new feature in education."

[13] United States Bureau of Education, Circulars of Information, No. 3, 1913, pp. 108-9.

Another manual labor school was established at Cave Springs, Georgia, in 1839, and was known as the Hearn Manual Labor School. This school continued to operate until it was destroyed by the Federal troops during the Civil War.[14]

JACKSON COLLEGE, TENNESSEE, MANUAL LABOR DEPARTMENT, 1832-37.

Jackson College was a Presbyterian school that took its rise in a manual labor institute in Maury county, some ten miles from Columbia. About the year 1832 the institute was erected by act of the legislature into Jackson College. In 1837 the college was removed to Columbia. It was burned by the Federal army during the war. A report of the board of trustees in the year 1833 tells us that the manual labor feature of the institute was retained by the college. Every student was required to work two hours per day. As the college was not able to build shops and buy tools for mechanical labor, the students had the past year engaged mostly in farming. They had with little help cultivated between 50 and 60 acres of corn and 2 acres of potatoes and had cleared 18 acres of new land. The writer of the report assures us that manual labor is beneficial to the help of students and as evidence that it does not interfere with their studies, says that those students who have been consulted concurred in saying that, instead of retarding, manual labor had accelerated their progress in study. Nevertheless, the manual labor feature was abolished when the college was removed to Columbia. * * *

FRANKLIN COLLEGE TENNESSEE, MANUAL LABOR DEPARTMENT, 1845—

Franklin College, five miles east of Nashville, was founded in 1845, by Rev. Tolbert Fanning, a prominent man among the Disciples, or Christians. It was opened as a manual labor school. Mr. Fanning aimed to bring education within the reach of the poor. The college was closed at the outbreak of the Civil War. The building was burned in 1866 and never rebuilt. The property is now devoted to the Fanning Orphan School.[15]

TROY CONFERENCE ACADEMY, VERMONT, A METHODIST EPISCOPAL CHURCH SCHOOL, 1833—

It is a part of the plan of the school to connect with it the manual labor system. This is required, first, for the preservation of the health of the student, and second, to bring education within the reach of those who are not able to pay the full amount of tuition and board of ordinary academies. This class is very numerous, and they are looking anxiously to the complete establishment of our academy in Poultney, with high hopes of obtaining a good education.[16]

[14] United States Bureau of Education, Circular of Information No. 4, 1889, pp. 60, 61, 70.

[15] United States Bureau of Education, Circular of Information No. 5, 1893, pp. 235-6.

[16] United States Bureau of Education, Circular of Information No. 4, 1900, p. 117.

ALLEGHENY COLLEGE, PA., MANUAL LABOR DEPARTMENT, 1830-40.

The college was reopened in 1833. A marked feature of the new course of study was the prominence given to manual labor. This was part of the movement which affected a large number of American colleges about this time, and arose from the demand for a "practical education," from the students' need of some means of self-support, and from the lack of facilities for physical exercise. In 1834 the trustees "set apart several acres to be leased to students at a nominal rent, and arranged to employ students to make furniture and carry on improvements about the college grounds. No one, however, was to be required to perform manual labor." Not a success. Not announced after 1840.[17]

WESLEYAN UNIVERSITY, CONNECTICUT, MANUAL LABOR DEPARTMENT, 1833-1839.

In August 1833, a seal was adopted and a strange departure, but one characteristic of early Methodist colleges, determined on. * * * Resolved, That the necessary arrangement for connecting mechanical and agricultural labor with the course of instruction be made, each student to labor at least two hours every day, the system to be introduced at once, so that parents may have assurance that the physical as well as the intellectual and moral education will be attended to.

This system was continued until 1839 and then given up, as it did not prove a success.[18]

HOWARD COLLEGE, ALABAMA, 1833.

In 1833 the Baptist convention appointed a committee of five "to establish in Alabama a seminary of learning on the manual labor plan for the education of indigent young men called to the ministry." This committee located the institution on a farm, purchased for the purpose, about a mile east of the town of Greensborough. In 1834 the convention resolved that the institution should have both a literary and theological department, and provided for its incorporation as the "Alabama Institute of Literature and Industry."[19]

The reasons for the failure of the manual labor system in the Alabama Institute of Literature and Industry, later known as Howard College, are interesting.

The impracticability of the manual labor system soon became apparent. * * * A hundred hands were to be employed by the superintendent for two

[17] United States Bureau of Education, Circular of Information, No. 4, 1902, p. 13.

[18] United States Bureau of Education, Circular of Information, No. 2, 1893, p. 258.

[19] United States Bureau of Education, Circular of Information, No. 3, 1889, Chapter 3, pp 172.

or three hours. The most of these had never been taught and they often did more harm than good. Implements and work shops in corresponding numbers had to be provided, these to lie idle three-fourths of every day, and often the fields would scarcely be reached before the bell would summon them to return, and that too often at a time when the care of the crop required immediate and prolonged attention. It was soon discovered that a full corps of regular hands had to be employed in addition to the students. But the students had to be paid for their labor, for the subscribers and patrons had been led to expect that in this way a student could meet the greater part of his expenses. Board and tuition had to be put at scarcely more than nominal rate. Board was $1.25 per week, and tuition $10.00 per session of five months.[20]

OBERLIN COLLEGIATE INSTITUTE, (LATER OBERLIN COLLEGE), OHIO, MANUAL LABOR DEPARTMENT, 1833-1838.

The Rev. John J. Shipherd and Mr. Philo P. Stewart decided to establish "A community of Christian families with a Christian school which should be 'a center of religious influence and power which should work mightily upon the surrounding country and the world—a sort of missionary institution for training laborers for the work abroad'—the school to be conducted on the manual labor system, and to be open to both young men and young women. It was not proposed to establish a college but simply an academy for instruction in English and useful languages; and, if providence should favor it, in 'practical Theology.' In accordance with this plan the corporate name, 'Oberlin Collegiate Institute' was chosen. Not until 1851 was a new and broader charter obtained, this time under the name of 'Oberlin College.'" "An essential of the Oberlin plan was the manual labor department. The objects to be attained by this department were eloquently set forth in the first circular of the institute as follows:

This department is considered indispensable to a complete education.

It is designed first, to preserve the student's health.

For this purpose all of both sexes, rich and poor, are required to labor four hours daily.

There being an intimate sympathy between soul and body, their labor promotes as a second object, clear and strong thought with a happy moral temperament.

A third object of this system is its pecuniary advantage; for while taking that exercise necessary to health, a considerable portion of the student's expenses may be defrayed.

This system, as a fourth object, aids essentially in forming habits of industry and economy and secures, as a fifth desideratum, an acquaintance with common things.

[20] United States Bureau of Education, Circular of Information, No. 1, 1888, pp. 271-2.

In a word, it meets the wants of man as a compound being, and prevents the common and amazing waste of money, time, health, and life.

But with five years of experimenting, these fond expectations vanished. Student labor was unable to compete with ordinary labor.[21]

WAKE FOREST COLLEGE, NORTH CAROLINA, MANUAL LABOR DEPARTMENT, 1835-1839.

The system as first introduced here required that each student should labor three hours per day, receiving three cents per hour for his labor. Finally the time was reduced to one hour per day, and after about four years the system was abandoned altogether.

Manual labor was unpopular with the students and the system was never from any standpoint even a nominal success. Professor W. T. Brooks, in an address before the alumni of Wake Forest College, in 1859, said: "The utter distaste which many of the students had for the system was but too evident when the bell rang for labor. When the roll was called some were taken suddenly ill (?)—unable to work; but when supper time arrived it was very apparent that their sickness was not unto death." Prof. L. R. Mills, in a sketch of the financial history of the college says: "It was supposed in the beginning that the students' daily labor on the farm would go a long way towards paying their board. After a close examination of their acccounts of that year (1835), I find that they made on an average for a year's work $4.04."[22]

OLIVET INSTITUTE (LATER OLIVET COLLEGE) MICHIGAN, MANUAL LABOR DEPARTMENT, 1844.

Olivet Institute, as it was first called, was opened in 1844. It was founded by John J. Shipherd, the founder of Oberlin. * * * Its doors were open from the first to colored students as well as white, both sexes, and to the poorer classes, who had not the means to secure an education elsewhere. Manual labor was to be a feature of the institution.[23]

The manual labor movement spread thruout the country in private and denominational institutions of higher or secondary grade, variously called college, seminary, academy, farmers' academy, institute, school, However, as educational institutions ranked in those days the so-called manual labor colleges were probably of secondary grade when compared with Harvard, Yale, Princeton, Columbia, Virginia, Michigan, and many others.

[21] United States Bureau of Education, Circular of Information, No. 5, 1894, pp. 56, 57, 59.

[22] United States Bureau of Education, Circular of Information, 1888, Vol. I, pp. 103, 104. .

[23] United State Bureau of Education, Circular of Information, No. 4, 1891, pp. 138-139.

FUNDAMENTAL REASONS FOR FAILURE.

How may we account for the very brief existence of a system so enthusiastically and vigorously started? Why did it not prove as successful as the Fellenberg schools in Europe? The answer is plain. In the first place the manual labor schools of the United States did not provide adequate funds to carry on the work, but expected the labor to pay for itself as well as for much of the expense of the other departments of the school; and, second, they did not, in spite of their early claims succeed in making manual labor educative. They formulated a panacea of values, but in practice they forgot the one thing which would have made possible a realization of at least a few of their claims for the system. They failed to secure the appeal of manual labor to the individual which makes it worth while—makes it really educative. Simply to assume that manual labor gives man good physical exercise, that it is adapted to interest the mind, that its moral effects are good, that it would promote habits of industry, independence of character and originality, etc. etc., and then to provide various odd jobs for students to perform who were primarily interested in preparing themselves efficiently for pulpit oratory did not work more effectively in those days than it would in our own.

What was needed then, as now, in all manual labor exercises conducted by the school, was life meanings for the student performing the work. The young men attending the manual labor schools had already passed thru the stage of development when mere disinterested curiosity in manipulation and in manual dexterity were sufficient motives for engaging in the work. Manual labor for them meant something more than play. But the manual labor of these schools, failing to mean something more than play, lost for the student the joy of play and inevitably became drudgery. The work was not designed to connect his interests with life, either immediately or remotely. Like many other subjects of the time it was prescribed for him as a discipline, but unlike other disciplinary subjects it did not appeal to him as having even a remote relationship, reputed or real, to his future vocation and interests. To be sure, many of the boys were from the farm, but they had gone to school with the purpose of being educated for something else. In those days education for work on the farm or in other industries was not in the category of interests of educators or of those to be educated. Happily also for the student and for the future development of educational manual labor, this department proved uneconomic, and for this reason was soon

dropped. One cannot but feel that it would have been in the interest of progress had the uneconomic aspect of other uneducative branches been as susceptible of accurate demonstration. Furthermore, for reasons already given and because there had been inadequate preparation by the student for taking up this work it could not be a financial success.

Never since that time has there been any organized attempt to substitute manual labor for play. It is worthy of notice that while we are now extending opportunities and requirements for work in industrial education we are giving equal attention to play and athletics.

VOCATIONAL GUIDANCE IN HIGH SCHOOL.

J. M. GREENWOOD.

THIS is pre-eminently the measuring age in which specialists are chiefly engaged in magnifying the glories of their office, but not its fruits. Vocational guidance is in that state of fluidity, a nebulous, intangible obscurity floating in a fog bank of platitudes, hard to get at and too slippery to hold. The real problem is to find a measure for the aspirations of a human soul physically, morally, spiritually, socially, and economically that will fit it into the right vocation for life. But the light thus far shed on this subject is mostly darkness, and the currents are interrupted.

DEFINITIONS.

1. In a brief discussion such as this, it is prudent to accept and recognize conditions as they are, and then to prosecute a further inquiry as to their genesis, and along what lines future development will probably follow.

An inquiry into the original meaning of "vocational guidance" will throw some light on one phase of the subject in order to get a clearer understanding of the subject. Vocational is derived from the Sanskrit root "wak" and from which we have "vac" speech, and it comes down to us thru the Latin as "vox," which translated into English is "voice." The literal significance is the voice that speaks to one.

2. Guidance is from the word "guide" which runs back into the Sanskrit root "wid," or "wit," which means to see, observe, to know, so that turned into plain English, we have "voice-wit," or "speech-wit."

This hasty excursion back into the word roots of the past leads to the conclusion that speech advising, is simply telling one what he ought properly to do, or refrain from doing. A better popular rendering would be the getting of wisdom and then acting prudently.

3. The present usage of the term "vocational guidance" somewhat loosely employed signifies that knowledge of the organization of such physical, psychological, and social facts pertaining to a young person as will enable a mature person, having a broader insight of human nature and the world's industries, to direct the boy or girl into some proper employment with a reasonable hope that he or she will eventually succeed

in that particular career. In a narrower sense as applied to the actual work of the school, it is the selection of suitable branches in a course of study best adapted to a particular pupil or a type of pupils. Some cities have vocational counselors or assistants to aid pupils in the selection of their studies and handwork; in others, surveys partly educational, social, and vocational, have been made as preliminary steps to such guidance. Guidance, therefore, takes two directions—training in general, and training for jobs. General training, if possible, should always precede special training for job work. There is a vast difference between a preparation for life and a preparation for a job; one is permanent and the other is temporary.

HOW IT WAS DONE BY PARENTS.

Since the days of Tubal Cain, the sons and daughters of men and women have been supposed to inherit some of the mental and physical qualities of their direct ancestors, and that their offspring had wit enough to learn under guidance to do the things their parents did. This is still practiced by people of simple habits of life generally.

When schools for training the intellectual and moral faculties were started among the advanced nations of the earth, the students were fitted more or less for certain learned and professional occupations, as they are now, thru general culture in colleges and universities. There was some vocational guidance in these seats of learning, which, however, allowed considerable choice in the matter of selecting a vocation, but not of studies. Especially did bright young persons follow, to a very considerable extent, their inherent tastes. A broad all around outlook is regarded as a better equipment for general work, than a narrow microscopic view of a very few branches only.

A PHRENOLOGICAL ATTEMPT TO FIT PEOPLE INTO OCCUPATIONS.

Upwards of a hundred years ago, Francis Joseph Gall had expounded his views on the subject of phrenology before many people in Vienna. This doctrine is based on the theory that there exists a certain relation between the several faculties of the mind and particular regions of the brain, and that these regions are the organs thru which the mental faculties manifest themselves. The brain, as a whole, is the organ thru which the mind acts. Under modern investigations this doctrine is known as that of localized brain areas. Specific functions is only a

modified scientific form of which Gall, Spurzheim, the two Combes of Scotland, the Fowlers of America, in a crude way had endeavored to formulate as a scientific interpretation of human nature. Whether the brain is a map of the man is still an open question. The phrenologists took cognizance of the temperaments of people so that their delineation of human nature really assumed the character of a scientific physiognomy of the human species.

As practical interpreters of human nature, there is no doubt that the Fowler Brothers, Nelson Sizer, and S. R. Wells, of this country, were among the foremost in that art, that the world has yet produced. One of their specialties was the ability to tell parents by an examination of a child's head, body, and temperamental conditions, what vocation in life it ought to follow; also to tell grown people what occupations they would succeed in. They often hit the mark exactly in telling men and women in what pursuits they were engaged, or in what line of work they were best qualified.

To arrive at safe conclusions, they took into consideration the whole structure of the subject examined, including the shape of the head, face, body, limbs, color of the hair and eyes, and all physical and temperamental conditions.

Notwithstanding the imperfect development of the subject and the valid objections to the pretensions of its advocates, it possessed a quasi-scientific basis far in advance of any method yet proposed in these later times. Any scientific basis that aims at exactitude must take into consideration the brain, the nervous system, and the bodily structure of the child in order to determine what kind of work it can do. This field is practically an unexplored region at present. Such an analysis and classification of a boy's or girl's mental and physical powers are essential, indeed necessary, for his success in a career demanding knowledge, skill, and motives for entering upon and prosecuting successfully any vocation, if this phase of inquiry is to assume a standing on a scientific basis.

THE PRESENT SITUATION.

The statistics tabulated from different sources in this country agree that children who enter the industries are usually about fourteen years old. There is a prevalent belief that if not taken out of school before sixteen they have passed the period when a trade appeals to them. Many of the native born mechanics began to learn a trade about their fourteenth year, and this fact confirms the general impression of the

public. Of a hundred children employed under sixteen years of age, only about twelve are in a position to learn a trade. A large majority of the others are employed in such occupations as stunt the mind and body. Very many become newsboys, errand boys, elevator boys, drivers of delivery wagons, etc. These low occupations unfit them for more desirable and gainful occupations. Here is one of the greatest wastes in human life. There is no other form of waste of our national resources that is comparable to this. The children from fourteen to eighteen years of age must pass thru this crucial test which has not been provided for in any adequate manner of legislation or otherwise. This is the critical period during which children may become productive members of the community, or a menace to the state.

Our so-called trade schools, out of some 303 occupations in which the workers of the nation are employed, thus far have restricted their operations chiefly to some woodwork, bricklaying and plumbing, and metalworking, a little printing and gardening for the boys, plain cooking, and planning of fancy dishes, cutting, fitting and dressmaking, millinery, typewriting, and shorthand for the girls.

The welfare of our working people and of the nation is at stake, unless some plan is devised to block the passage thru which so many of the boys and young men of native ability drift into a very low grade of unskilled work. A low grade output of raw material causes an increased cost of production and stationary or diminishing wages as measured by purchasing power. It looks as if our national appetite, or power of consumption, has rapidly outgrown our capacity for the production of the necessaries of life. Population is outrunning the means of subsistence, bringing us face to face with one phase of Malthus' theory. A more productive method of agricultural and stock-raising industries will tend possibly to level down the cost of subsistence. An issue is squarely presented to the educators of this country to meet in a large way the duties violently thrust upon them. The means thus far employed are inadequate, reaching not more than one per cent of those who should be trained for skilled labor. The latest available statistics dealing with the occupations of persons over ten years of age show definite work for 80 per cent of the males and 18.8 per cent of the females. That is, four-fifths of the males and one-fifth of the females are employed in paying occupations. In 1900, there were 600,000 carpenters in the United States, 277,500 painters and varnishers, 97,785 plumbers and gas-fitters, 290,000 iron and steel workers, 155,174 printers and pressmen, 364,884 dressmakers, 87,849 milliners, and 50,717

electricians. The number engaged in agricultural pursuits was 10,381,765; mechanical and manufacturing activities 7,085,309; 42,326 wholesale merchants; and retail dealers, 790,886; transportation 582,150 employes; in personal service, 2,577,957; 1,560,721 saloon keepers; and 1, 455,677 servants and waiters. These startling figures show what a pitiful field in the special industries, "vocational guidance" has to offer to the child that wants to become a skilled workman. Comment is best expressed by the unspoken.

AN EFFORT TOWARD GUIDANCE.

At the outset, it is legitimate to inquire what are the qualifications for guiding boys and girls into the kind of work each is best fitted by nature to do. Are there any signs that will enable one to tell in advance what career a pupil is qualified to enter upon? Of the million and a half of the boys and girl in our high schools and the eighteen millions in our elementary schools, nearly all will soon enter the industries as workers or leaders; our most valuable assets in the country are these young prospective citizens. All depends upon their general knowledge, intelligence, industry, skill, and constructive ability. It is not only for the high schools particularly, but for all upper grades of the elementary schools that vocational guidance must be considered.

QUALIFICATIONS OF THE DIRECTOR.

The director or counselor should be a good scholar of broad and liberal culture and possess a theoretical and practical knowledge of the larger lines of industry of the vicinity in which the school is located. He should have been connected with business of some kind a sufficient length of time to understand mercantile, manufacturing, and other industries from the standpoint of the employer and the employe. He should be able to give advice on how to eliminate waste in work and in material. This knowledge can be acquired only thru actual experience. Granting that this director is thus equipped, yet he may be utterly ignorant of the mental, moral, and physical qualifications of the one who seeks guidance. The supply of competent guides, so far as I have yet heard, or read, is a waiting and wanting commodity in the market. Principals and teachers are capable of directing pupils in their studies in school. That part of guidance is fairly well done. In a general way there are personal

qualities or characteristics that bar some persons from engaging in certain occupations. Elementary teachers may make mistakes in regard to advising pupils to take, or not to take, certain subjects in high school. When advice is sought and is given thus early in life, the elementary teacher should have a general conception of the different courses offered in the high school the pupil expects to enter. Such advice is for four years only, and yet it has a bearing on the whole life of the child. To know a pupils' ability to meet all the requirements of a high school course and to avoid some waste is well nigh impossible. The difference between shopwork and scholastic work is so great in kind and output that there is no necessary connecting link between them. The one is chiefly concerned with a material output, and the other with the development and culture of an expanding human soul. Notwithstanding all that has been said and the uncertain direct progress thus far made in vocational guidance, yet everywhere on the anvil is being hammered out by blind impulse a sort of workable method that will result in something valuable eventually.

Flippantly enough, we advocate the adaptation of the school work to the daily vocations of the community, but when it comes to picking out the boy or girl for the job and fitting him or her into it without fail, a new revelation is needed.

ANALYSIS OF THE SITUATION.

In the last analysis, the question is how to pick out the high school boy or girl and fit him or her to a life-long job. This narrows the question within simple limits. On this point an interesting investigation was made by the Massachusetts Commission on Industrial and Technical Education which tabulated information of over three thousand families of the state whose children had quit school to go to work.

Upon inquiry it was developed that sixty-six per cent of those families could have continued their children in school; thirty-three per cent of these children were found in unskilled industries; sixty-five per cent in low grade industries, and less than two per cent in high grade industries. The boys left school usually for a job, not to learn a trade. All sorts of attractions, usually of a temporary nature, had appealed to them, and they had drifted from one thing to another. This is a waste pure and simple from whatever standpoint it is viewed. Our country is not alone in this aimlessness, since investigations in Great Britain show the same facts. The usual places of loitering, after leaving job after job,

is on the street corners, in pool halls, around bulletin boards on which advertisements are posted for laborers, or in looking over the daily want "ads" in the morning and evening papers. If this condition be transferred to the high school pupils, the facts are not materially changed.

Vocational guidance has its problems clearly stated, as the writer sees it, and here the work must be done. What reply can it give? If there is a right way, or something better than the tentative plans that have been half consciously evolved, it is time they be set forth. Some high school teachers having learned what vocational occupations offer probable openings to young persons, and knowing their wants and capabilities fairly well thru frequent interviews with applicants, employers, and managers of labor, have succeeded in placing some worthy boys and girls in good positions. Small booklets containing information in regard to certain industries carried on in a city and the opportunities for advancement—the volume of business of various kinds and the requirements for each kind of labor, etc.—would give a sort of piloting chart to the teacher, parent, and the child, a basis upon which a special line of work might be chosen congenial to the child and to which he is fitted. Whatever is done here to aid the child, his mind ought not to be directed away from the continuation of school work after once quitting the schoolroom. This plan simply places facts and conditions before the parents and the child with the supplementary information pertaining to specific lines of work. An observant teacher can tell with some degree of certainty what particular lines of work a pupil is likely to succeed in doing. But this is what most people have always known, and the child has often turned by his own impulses to undertake certain things. The sketch outlined is a sort of triple union including the parents, teacher, and employer to prevent the boy's becoming a drifter, so that he may become a skilled workman and a learner during his life. This is the aim of intelligent citizenship. It appears to the writer that this new profession has to be created, and its duties defined, if it is to be advanced beyond the handling in an empirical way. The first qualification of such a specialist is to know human nature as he sees it in the raw, and what it can be trained into doing most successfully among the 303 different occupations in which the American people are engaged. The preliminary knowledge must include the physical, moral, intellectual, social, and economic phases of the applicant's equipment and constructive ability potentially for success in a particular line of work. A complete inventory of the child's possibilities, including his potential stock of brain and hand power, ought to be made upon a basis of scientific ac-

curacy. This is the personal equation demanding investigation in all its varying factors. There is no special department of human nature in our universities now that is competent to deal with this subject. Such a department ought to be created.

In the fields of employment, under modern stressed conditions, shifting and changing and displacements, are constantly occurring. Restlessness and economic waste abound on every hand. One is tempted to ask what is the matter when everybody complains? Beginners usually see just ahead, if diligent and improving in their work, to a chance for better wages, which acts as a stimulus for a time; but not always when changes and strikes and lockouts are common. The employers of labor value permanent and progressive and improving employees. All these factors should center about one who enters an occupation with the view of becoming an efficient worker, and wants to be weighed by the employer, and to weigh himself by his own ideals. To fit the boy or the girl to the job, or the job to the boy or girl, there is the rub, and it is still rubbing.

WHAT NEW YORK CITY IS DOING.

A statement from New York City will throw some light on the practical working of high school vocational guidance. It is entitled "Report of the Students Aid Committee of the New York City High School Teachers' Association on Vocational Guidance." The aim of this committee is to aid deserving students to secure employment during vacations and out of school hours in order to earn a part of their support; to advise those who are ready to leave school in the choice of a vocation; to direct them how best to fit themselves for their chosen vocation and to assist them in securing employment which will lead to success in those vocations. This statement is clear and comprehensive, and is everything that could be expected from the teachers' standpoint.

Here is another very interesting fact which is perhaps the most important one in connection with the whole question involved, and it sparkles brilliantly in an unexpected quarter. Observe the fact. Ten thousand pupils left the New York high schools to seek employment in industrial and commercial fields, and less than ten per cent sought the advice of the committee in securing employment. This tenth was evidently the most helpless. The committee further reports that four times during the year, the list of applicants was practically exhausted. The meaning of this is that all the high school pupils had found em-

ployment. But a report of one hundred and ninety-three representatives of the labor unions showed that sixty thousand, or twenty-eight per cent, were out of employment, while a canvass of all the eleven hundred students of an evening high school showed that only three per cent were unemployed.

The significant fact is that of the pupils more than ninety per cent had helped themselves to find positions, and they obtained work and held their jobs, and that the committee thru conferences with employers of labor had succeeded in placing those who needed their help. Whether the work will be better handled by specialists, looking at the object from a narrower vision, than by the teachers who size up pupils from the kind of school work the pupils did daily, is a question that time only will determine. The tendency at present is in the direction of specialists for all kinds of work that many common people can do as well. But the most recent investigation, made in New York where this particular kind of work has received the most careful attention, is to the effect that "there are no jobs for children under sixteen which they ought to undertake."

Another conclusion is that a study of the facts of industry is, therefore, the only sound basis for discovering what type of industrial training, whether pre-vocational, or continuation schools, should be attempted.

Most people go thru life indifferent to its great purpose, acting under the impression that things will turn out well, or at any rate, better in the end. It is a truism that every one can not do everything, and yet the recklessness with which vocations are happened into is one of the queerest corners in individual history. So often interest lies in one direction and the work one does in another. To face this problem in a manly way is to ask what is it, what is its purpose, its full meaning, and the underlying principles upon which it is based, and how these can be put into successful operation and reduced to a working test. If it is a question of human knowledge, it has been developed out of human experience. No knowledge is possible outside of some sort of life experience. The content of any science is simply an embodiment of human experience arranged on a scientific, or semi-scientific conception for thinking and working purposes. Life leads one to a point where one begins to reflect or think about his knowledge, and when the young person has reached this condition his case is hopeful.

CONCLUSIONS.

(a) As a general statement, the one who is just a specialist is a

narrowist, and sees only in straight lines just before his nose.

(b) The greatest thing a boy or a girl can learn is to do one's duty cheerfully, even when it is unpleasant.

(c) A young person who is placed in a wage-earning position should be followed up by a systematic oversight with the same care as he was in his behavior and studies in the upper grade work in the elementary and high school.

(d) He should do his present job so well that those who inspect his work will advance him to a bigger and better job.

(e) He must accustom himself to pull hard against the collar whenever necessary, and not grumble.

(f) He must continually increase and solidify his knowledge and grow in it every day.

(g) As a man he must be bigger than his job, however large it may be. If one is settled on the bed rock of right, duty, obedience, industry, and keeps a good aim before him and lives up to it, he has no need of a Regularly Certificated Vocational Counselor outside his parents, immediate teachers, and a safe business or professional man from the outside.

SOME ESSENTIALS IN A MANUAL TRAINING CREED.

PRESENTED FOR CONSIDERATION BY THE SCHOOL CRAFTS CLUB, NEW YORK CITY.

I. Manual training has come to an established and permanent place in our scheme of education: (1) because it is based upon the biological necessity for activity and self-expression to child life and growth, and (2) because it represents in the school the industrial arts which form the foundation of our present civilization.

II. Developing individuality and power is forming what are essentially the vocational determining factors in child life. This is coming to be accepted as the business of education up to the time when vocational work or training must be taken up. It follows therefore:

(1) That this whole period is significant as prevocational education.

(2) That this is the particular period wherein the manual training idea applies, and indicates the relation of manual training to the vocational interests of education, as distinguished from specific vocational education.

III. Actual experience in productive activity, as contrasting with mere information getting, must continue to be the distinctive feature of the industrial arts work in our schools. In addition the practice of the industrial arts will provide for all ages concerned a distinctive subject matter and method of instruction.

IV. The child's relation to the social world is the important factor determining the character of the work for different ages. To understand the social world and needs of the child at different ages is the heart of our present day problems.

V. The great practical problem is to see to it: that all motor activity is enriched with idea and image; that all technical power is supplemented by social insight; that genius of both the mechanic and the craftsman order is fostered; that both the art and the science of industry are represented; and that not only the practical and the industrial, but also the humanistic significance of the manual arts be expressed in our school workshops.

It is clear that these considerations involve more than the manual arts teachers, and that they demand a more effective cooperation of all departments of the school.

Much of the informational content is in fact the subject matter of other branches of the curriculum. The information which can appropriately be considered the business of the workshop is that which relates to or depends upon technical matters and practices. This is important and large in amount because so much in the modern industrial world can be understood and so appreciated only thru technical insight.

VI. To meet the foregoing requirements and place the manual arts on a basis where they will produce adequate educational results they must be given (1) an increased industrialized subject matter and meaning, and (2) an increase of time which will provide adequate experience and opportunity to realize the results desired.

Committee of the School Crafts Club, New York City.

A. W. Richards, Chairman.
E. B. Kent
W. T. Bawden
A. W. Garrett
William Noyes
M. W. Haynes.

EDITORIAL

VOCATIONAL Guidance seeks to take the selecting of an occupation out of the realm of chance and of clairvoyance and to put it into the realm of practical science. Instead of sending a child to a phrenologist that his bumps may be examined, or to the fortune teller that his palms may be read; instead of trusting to luck and telling him to take the first opportunity that presents itself to earn money vocational guidance aims to study the child's tendencies, tastes and capacities, and then help him to fit himself for the best position he is potentially capable of filling. Instead of leaving the entire responsibility for guidance with respect to occupation with the parents, who too often misinterpret the interests and tendencies of childhood, the teacher's special knowledge of the child is utilized. From one point of view vocational guidance is nothing new; all good teachers have exerted some vocational influence upon their pupils. From another point of view it is quite new because it organizes and systematizes and renders more intelligent and more effective what has been done only incidentally before. The problem of vocational guidance, then, is, first, to find out by what means guidance can best be accomplished under school conditions, second, to utilize these means.

Manual Training and Vocational Guidance

It seems hardly more than a truism to say that in order to give effective vocational guidance a teacher must know his pupils and the requirements of possible occupations. He must know the habits of thought, the mental and moral tendencies and limitations of each of his pupils; he must know the tastes, the skill and the deficiencies. Then he must know possible occupations. In order to be especially effective the teacher needs to know more than what he has read in a pamphlet or two. He really ought himself to have had some personal contact with the occupations which he is judging and helping his pupils to judge. It is not easy for a teacher to determine whether a boy's interest in seeing "the wheels go 'round" indicates that he should become an engineer or whether it is merely an interest common to all boys, and therefore indicates nothing vital in his case. Before the teacher can have reasonable ground for judgment he must see the boy react under conditions that approximate those of the occupation he should enter. In other words, any school, in order to be most helpful in reference to vocational guidance, needs to

provide experience in the fundamental elements of many occupations. This is essential from the standpoint of the teacher who is to do the guiding, and even more essential from the standpoint of the pupil guided, because his taste for and interest in an occupation is affected by his experiences. The elements of occupations must be found in the schools, and the wider the range of occupations with reference to which the school would afford guidance the broader should be its curriculum. The teacher cannot give safe guidance with reference to the practice of medicine, for instance, until he has seen the pupil react in biological science, or with reference to mechanical industry until he has seen him in a workshop. It is the broad curriculum that counts most in a school planned to give vocational guidance. For the teacher to furnish facts about occupations—demand, supply, wages, healthfulness, etc., is of some value, but not so vital as experience in the fundamentals of the occupations themselves. This statement makes it clear why manual training has such an important relation to vocational guidance: It furnishes experiences that are fundamental in a large group of occupations. The statement has been made that a well balanced elementary school curriculum should include work in all of the following manual arts: the graphic arts, the plastic arts, the textile arts, the bookmaking arts, the mechanic arts. From the standpoint of vocational guidance such a broad, or extensive experience in the manual arts is of greater value than an intensive experience in one craft. Manual training, then becomes a very important factor in vocational guidance; vocational or trade training should follow after vocational guidance has done its work, or most of it.

In a recent article in *Vocational Education* Frank P. Goodwin has pointed out that in most city school systems there are two distinct problems in vocational guidance, (a) the elementary school child who will not go to the high school, and (b) the student who expects to take the high school course. For the latter the modern democratic high school with its courses in shopwork, drawing, science, commerce, music, art, literature, history, economics, mathematics, etc., provides the right basis for work in vocational guidance. Concerning the former Mr. Goodwin seems to think that little can be done in vocational guidance "except as prevocational training, manual in character, is introduced into the elementary school." He points out that this view has been substantiated by the Chicago City Club Survey, by the New York Survey, and by the Cincinnati Work Certificate Office. Fortunately this thing

that is being pointed to as something that can be done is already being done in several cities. "Prevocational," "semi-industrial," and "elementary industrial schools" are being established, and more are quite sure to follow. But the question may be asked, What is this "prevocational training, manual in character?" The question is easy to answer. When the details are studied it becomes evident that this prevocational training is essentially manual training given adequate time in the daily program to function educationally. It is manual training extended and broadened and enriched on the industrial side. It is manual training coming into its inheritance. It is the original manual training ideal realized at last.

Vocational guidance does not mean requiring or even allowing the teacher to select the occupation for the pupil. It does not mean depriving the child of his birthright to choose his own occupation. But it does mean guiding him so that he is quite sure not to make a serious mistake in choosing. In this guiding process the school work is an important factor, and because manual training stands in the school as the representative of a large number of occupations, those which are essentially manual in character, it becomes a very important factor in vocational guidance.

—C. A. Bennett.

Forty-Four Hours a Week Last October when we published in this department an argument for more time to be given to manual training in the upper grammar grades we did not foresee the effect it would have in calling forth letters from teachers in all parts of the country. At that time our imaginations had never more than begun to picture the variety of "impossible" conditions under which manual training work (or work under that name) is being attempted. Our December and April editorial notes revealed some new varieties, but the end is not yet. We hope, however, that nothing worse can be found than the following which comes from a college graduate with two added years of pedagogic training who is in a large city in a state that is noted for its progressive action with reference to industrial education:

> I am seeking another position this year because the work here is too heavy. I teach 44 hours a week and must cut stock outside of that time. I have regular and irregular about 650 students a week. Now no man can do justice to his work or to himself under these circumstances. I certainly feel that it is the poorest work that I have ever done and I have worked the hardest.

It is difficult to understand how any superintendent would allow—not to say require such a condition to exist. This man has three times as many pupils as he ought to teach and spends nearly twice as many hours in teaching as any man ought to spend in that kind of work. Our vocabulary of epithets is wholly inadequate when confronted with a realization of what such a condition means to this teacher, the boys under him, and the attitude toward manual training in that city. Ill health for the teacher, bad habits for boys, manual training in disrepute. What stupidity!

In marked contrast with the above was a letter received a few days ago from a teacher in Oakdale, California, which contained the following paragraph:

> The time of my present classes is eighty minutes a day, five days a week, and forty weeks in the year. That it is appreciated is shown by the boys being on hand at the tap of the bell. Some of them work at odd periods, some of them stay after school and some work is done on Saturdays. Just now we are building canoes, so there promises to be almost a night shift, and let me say I am willing to help them at these odd times.

Prize Winners

We give below the results of the "competition" announced in our February issue. The judges will prepare a statement concerning the awards which will appear with some of the drawings in either the September or the October number. This statement will give some of the reasons for their final decisions. In Class E only one drawing was submitted, and that was not considered worthy of a prize. The awards were as follows:

ClassA—A seventh grade problem in benchwork.

First Prize, Fern Stand, M. J. Sherwood, Kalamazoo, Michigan.
Second Prize, Step Ladder, L. R. James, Porterville, California.
Third Prize, Caned Foot Rest, L. D. Perry, Joliet, Illinois.
Mention, Wondergraph, J. H. Sandt, Winona, Minnesota.

Class B—An eighth grade problem in benchwork.

First Prize, Nail and Screw Tray, C. H. Oltman, Viroqua, Wisconsin.
Second Prize, Costumer, L. D. Perry, Joliet, Illinois.
Third Prize, Footstool and Slipper Box, S. S. Tingle, St. Paul, Minnesota.
Mention, Tea Table, L. D. Perry, Joliet, Illinois.
Mention, T-Square, H. Froling, Natick, Massachusetts.

Class C—A farm problem in benchwork for a rural school or a town high school.

First Prize, Farm Gate, E. E. Sowers, Arcadia, Indiana.
Second Prize, Chicken Coop, L. D. Perry, Joliet, Illinois.

Third Prize, Milking Stool, Clay C. Curran, Glencoe, Minnesota.
Mention, Mail Box, L. D. Perry, Joliet, Illinois.

Class D—A high school problem involving benchwork and wood-turning.

First Prize, Pedestal, L. D. Perry, Joliet, Illinois.
Second Prize, Dresser Set, W. R. Hull, Pittsburgh, Pennsylvania.
Third Prize, Piano Bench, L. D. Perry, Joliet, Illinois.

Class E—A small construction problem in machine shop work.

No awards in this class.

AN IMPORTANT CHANGE.

On one of the advertising pages of this issue we have made an announcement of great importance to every one of our subscribers. The announcement states that beginning with September, 1914, this magazine will be combined with *Vocational Education* to produce one strong monthly publication. This is a long step forward, and one which we believe will be heartily welcomed by our readers. Anyone who has followed the discussions concerning vocational guidance and vocational training during the past two years cannot fail to realize that the great problems in these fields center around the upper grammar and early high school period just before and soon after the child passes the compulsory age limit of schooling. Moreover, it is becoming clearer that the proper basis for both vocational guidance and vocational training as such is a reasonably broad fundamental education which includes instruction in some kind of organized handwork; and further, that this instruction in handwork should not be too narrow in its scope. As might be expected under these circumstances, the two educational movements which started respectively as the manual training movement and the voctaional education movement are rapidly and inevitably converging into one strong current of educational advance. This being so, the time is ripe for bringing together the two magazines which have stood for these two movements. For this reason, and for others stated in the announcement, we are glad to offer to our readers one strong monthly magazine instead of two bi-monthlies.

ASSOCIATIONS

SCHOOL CRAFTS CLUB.

The second stated meeting of the year was held at the Broadway Central Hotel, Broadway and 3rd Street, New York, on Friday evening, January 9th. The chairman of the evening was William A. Carter. At the request of the program committee a number of members brought in specimens of work made by boys in the shops, and the early part of the evening was spent in examining the suggestions thus offered.

The first part of the formal program consisted of a discussion of the question: "What of Value to the Interests Represented by the Club May Come Out of the New York School Inquiry?" The discussion was opened by William T. Bawden, who called attention to the fact that at least three of the volumes that have resulted from the work of the Inquiry deal with questions that are related to the interests of this Club. In the "Report on Intermediate Schools," by Dr. Frank P. Bachman, a presentation is made of the special advantages of this new type of school in which handwork of various kinds is expected to play an important part.

Among other considerations, the intermediate school makes possible certain economies in administration, teaching force required, and equipment. At any rate, figures are quoted to maintain this contention. For example: in 14 regular elementary schools in the city, having all grades, the manual training teachers average 338 pupils per teacher; whereas, in two intermediate schools, having only 7th and 8th grades, the manual training teachers average 368 pupils per teacher. The report then goes on to state, without inquiry into the question of the proper *size of class*—"it therefore appears that intermediate schools need fewer manual training teachers than schools having all grades."

The speaker suggested that the School Crafts Club might set a committee to work to make a study of the possibilities of development under the intermediate school plan, including outlines of courses of study which would offer suggestions as to the contribution that handwork can make when it is proposed to organize a school with differentiated courses of study, in the attempt to adapt the instruction somewhat more definitely to the needs of individual pupils. This study could also include those schemes of organization and administration that promise to yield the best results in a school of this type, and the committee might raise and attempt to answer the question as to the proper size of shop classes upon some other than a statistical basis. Another important problem for study in connection with the proposed intermediate schools is that of vocational guidance, and this Club is the logical organization to take the initiative along this line.

The second volume referred to is the "Report on Vocational Schools," by Dean Herman Schneider. This report, it was suggested, could be taken up by the Committee in the same way, and a careful study made of the recommendations contained therein. The same suggestion was made with reference to the

"Report on Course of Study for the Elementary Schools," by Professor Frank M. McMurry, with the following specific points for study: (1) Are the cases of shop instruction which have been selected for discussion in this report typical cases? (2) If so, are the criticisms offered just or unjust? Is work of the kind described defensible or not? (3) Does the shopwork as now carried on in the grammar grade shops provide real opportunity for the development of initiative? (4) Outlines of plans and methods for the improvement of the shop instruction, for discussion by the Club at its meetings, and for presentation for possible official approval after thoro revision.

The discussion was continued by James McKinney, of the Ethical Culture School, and Albert W. Garritt, assistant supervisor for the New York City schools. The topic was then thrown open to discussion from the floor, and the response was so prompt and vigorous that the chairman found it necessary to announce a limit in order that the remainder of the program might be carried out.

The second part of the program consisted of four illustrated addresses on shop projects: "Games—How to Make Them in the Workshop; How to Play Them in the Open," by John J. Nolan; "The Construction of a Three-Armed Towel-Rack," by Frank H. Pierce; "A Steam Engine and an Electric Motor for the 7B Grade," by E. G. Hainert; "Jigs and How to Use Them in the Woodworking Shop," by Fred P. Reagle.

At the business session the Club voted to instruct the Executive Committee to create a special committee to initiate an inquiry along the lines suggested by Mr. Bawden, to report at future meetings of the Club. It is understood that the Program Committee will cooperate with the special committee in arranging opportunities for full discussion of any matters which it may be prepared to bring before the Club.

THE PUBLICITY COMMITTEE.

MICHIGAN INDUSTRIAL ARTS AND SCIENCE ASSOCIATION.

The annual meeting was held at the Hackley Manual Training School, Muskegon, Mich., December 15, 1913. At the evening session two very interesting addresses were given by Superintendent J. M. Frost, Muskegon, and E. H. Sheldon, of the Sheldon Manufacturing Company.

Superintendent Frost, speaking on "Individualism in Manual Training," made an earnest plea for the cultivation of individual ideas and methods of work among both pupils and teachers. He said in part:

"My experience has been that the best solution of any problem is arrived at by the concerted opinion of different people working on this problem from different points of view. The workers from the Michigan cities here represented have enough different elements entering into the various problems to be able to give a pretty definite idea as to what it is best to do in the line of manual training and industrial work in the schools of the state. We must have specialized workers to work out the problems thru their individual ideas and independent ways of doing things. Original methods are what are wanted and looked for."

Mr. Sheldon took for his subject "Manual Training From a Manufacturer's Standpoint," and spoke of the necessity of having accurate tools with which to work, of having a high standard in this regard, and doing everything possible to get the pupils to work up to it. He also spoke strongly in favor of accuracy in work, saying that there is nothing so discouraging from a manufacturer's point of view as an individual who allows mistakes to pass by him because he has not acquired the habit of being accurate.

The following officers were elected for the ensuing year: president, Harry M. Kurtzworth, director of drawing, Hackley Manual Training School, Muskegon; vice-president, M. J. Sherwood, Kalamazoo; secretary-treasurer, A. E. Jacobson, Muskegon.

WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.

The twenty-first annual convention was held in Milwaukee, May 6-9, 1914. The facilities of the immense Auditorium were placed at the disposal of the Association. The general topic for the convention was "A Casting of Accounts Educationally, of the Fine and Industrial Arts." Special round table sessions were devoted to Art, Vocational Education, Household Arts, Manual Training. There was also a special joint session of the Association with Wisconsin School Arts and Home Economics Association. It is hoped that a more adequate report of the convention may be presented later.

EASTERN ART AND MANUAL TRAINING TEACHERS' ASSOCIATION.

The fifth annual convention was held at Atlantic City, N. J., April 9-11, 1914, and a very successful meeting is reported. Among the addresses were the following: The Fine, Industrial, and Household Arts in Education, C. N. Kendall, Commissioner of Education, Trenton, N. J.; How Far is Art a Factor in the Present Need for Industrial Education?, Secretary C. A. Prosser, New York; Design in the Common Thing, Royal B. Farnum, State Dept., Albany, N. Y.; Vocational Guidance as an Opportunity for Teachers of the Practical Arts, Prof. F. G. Bonser, Teachers College, New York; The Conservation of Beauty in the Industrial Arts, Miss Emma M. Church, Chicago; Pottery, G. C. Greener, North Bennet Street Industrial School, Boston; Vocational Courses in the High School, F. E. Mathewson, Jersey City, N. J.; The Training of Taste Thru Printing, Henry Turner Bailey, North Scituate, Mass.

ILLINOIS MANUAL ARTS ASSOCIATION.

Altho the Illinois Manual Arts Association is much larger than formerly, it still retains the same fine spirit of good fellowship that has characterized the organization ever since its first meeting ten years ago. This year the annual meeting was held at Lewis Institute on February 13th and 14th. The president, Professor A. C. Newell of the Illinois State Normal University, provided a very attractive program and the local committee, headed by George A. Ross of Lewis Institute, planned the warm welcome that Lewis Institute

so well knows how to give. Moreover, thru Mrs. Ella Flagg Young, the Chicago teachers of manual training were allowed a half-day off from teaching in order to attend the meeting. This was much appreciated by the officers of the Association as well as the Chicago teachers. Among the many agreeable impressions left by the meeting were the hospitality of Lewis Institute, the president's humorous stories at the banquet, the success of the round-table scheme for serving the varied interests of the members, and the presence of so many Chicago teachers.

The meeting opened on Friday afternoon with a paper on "Cement Work" by Bristol E. Wing of LaSalle. This was followed by a discussion of "Definite Things a Boy Should Learn about Woodworking in the High School," by George A. Ross. Then the audience divided into three round tables as follows: applied arts, M. F. Gleason of Joliet, chairman; machine work, W. F. Raymond of Bradley Institute, chairman; and mechanical drawing, A. W. Chase of Chicago, chairman. In these round table sessions the discussion centered on the practical problems of specialists and were very profitable.

The banquet followed soon after six o'clock and was admirably served by the young women of the Domestic Science Department of the Institute. A pleasant address of welcome was made by Dr. Edwin H. Lewis, in which he said in speaking for Lewis Institute, "We have felt that manual training ought to be so well taught that if a man wanted to make use of it he wouldn't have anything to unlearn." In this sentence he spoke the sentiment of the entire Association. This welcome was followed by the president's address on "Self-Starters," a parable of the automobile. He spoke of hand starters, mechanical starters, air starters, gas starters, and electrical starters, pointing out the principles involved in each and applying them to educational problems. He gave emphasis to the need of vocational guidance and insisted that it should begin early. "Like plaster-of-paris the boy's set comes early." The teachers' work is therefore of great importance. "Watching the vocational temperature of a boy may reveal a danger, as the sea captain notices the danger of icebergs by the change in the temperature of the water."

The plan and motive of the Lucy Flower High School was presented in a most acceptable manner by Miss Wells, the principal. She spoke of the school as the outcome of Mrs. Young's desire to do something for the girls comparable to what had already been done for boys. Miss Wells added a new contribution to the discussion of "fundamentals" when she said that the real fundamentals in the education of the girl were (1) health, (2) ideals of living, (3) hospitality, and she made these loom up large as she developed her subject. Another significant sentence dropped by Miss Wells was "The first thing for these girls to do (those who had fallen behind in the grade work) is to *succeed.* It is an awful thing to have a girl feel at thirteen or fourteen that she has been a failure."

Miss Wells was followed by William M. Roberts, district superintendent of schools in Chicago, who spoke on "Vocational Guidance and Education of Boys." He made his hearers appreciate the largeness of the problem when he told of the 15,127 work certificates issued in Chicago last year and stated that two-thirds of these were to boys who went to work as soon as their fourteenth

birthday had been reached. He made the audience see the depth of the problem when he pointed to the fact that in the industries there is an enormous demand for the unskilled, and that to teach skilled occupations to all children would not change this demand. He asked the question, "What shall we do? One who looks out over the field must see the 60 per cent must be in the unskilled occupations because they can't get into any other. What can be done for the one who fails to get a good job because there is none?" Then he answered his own question in part when he expressed the opinion that the time had come when the industries themselves must change the conditions for their workers. They must be made better.

On Saturday morning the general subject may be stated as "Teaching and Teacher." M. J. Lyon of Normal discussed the content of a course in light woodworking for the fifth and sixth grades. Professor Leavitt of the University of Chicago gave a strong address on "Teaching as a Vocation." Principal William B. Owen of the Chicago Normal College gave a characteristically logical discussion of "The Training of the Manual Training Teacher," and Professor Bennett of Bradley Institute presented a comparative study of three typical methods of teaching the manual arts. These were followed by the reports of committees and the election of officers for the coming year. The officers were, S. J. Vaughn, DeKalb, president; L. D. Perry, Joliet, vice-president. The convention closed with a round table discussion on "Woodworking" Saturday afternoon led by Albert G. Bauersfeld, of the Lane Technical High School. Next year the meeting will be held in Danville.

NATIONAL EDUCATION ASSOCIATION.

The April Bulletin contains the text of the report of the Committe on Resolutions, presented at the Richmond convention of the Department of Superintendence, February, 1914. Two of the resolutions are as follows:

Resolved, That we indorse the movement to establish and support vocational schools for pupils over fourteen years of age; that we urge the special preparation of teachers for this vocational work; that we encourage the establishment of continuation schools for boys and girls between the ages of fourteen and eighteen years who have entered vocational life; that we recommend that the attendance upon these continuation schools be made compulsory for such boys and girls between the ages of fourteen and sixteen.

Resolved, That every rural school should provide a home including a small farm for the teacher. This teacher will be one trained for rural schools, will know the child and his needs, will cease to be a tramp teacher, will be able to correlate school life with life in the country, and will be a leader of men; that we favor a county or a larger administrative district union for rural school work, thus providing equality of educational privileges, equalization of taxes, adaptation to the growing needs, and efficient supervision.

The Department voted to hold its next convention at Cincinnati. Supt. Henry Snyder, Jersey City, N. J., was elected president, and Mrs. E. C. Ripley, assistant superintendent of schools, Boston, Mass., secretary.

The April Bulletin also contains full information concerning railroad rates,

hotel accommodations, and the preliminary program announcement for the annual convention of the Association in St. Paul in July.

The sixth session is to be devoted to a discussion of "The Needs of the Public Schools," with the following addresses: Systematic Education for Pupils Leaving School Too Soon, Pres. L. D. Harvey, Stout Institute; Industrial Education, E. G. Cooley, Chicago; Vocational Education, Its Menace, Charles H. Keyes, Saratoga Springs, N. Y.; Adaptation of the Work of the School to the Everyday Needs of the Life of the Community, State Supt. J. Y. Joyner, Raleigh, N. C.

At the sessions of the Department of Secondary Education the following papers will be presented: The Utility of the German Continuation Schools—Their Imperative Need in the United States, E. G. Cooley, Chicago; Progress in Technical Education in Cleveland, R. L. Short, Cleveland, O.; Some Things Worth While in Technical Instruction in Secondary Schools, E. G. Allen, Detroit, Michigan.

The Department of Manual Training and Art Education will consider the Report of the Committe on Vocational Education and Vocational Guidance, R. J. Fuller, North Attleboro, Mass., chairman. President Carroll G. Pearse, State Normal School, Milwaukee, will discuss Vocational Education and the Need for Terminology. The president's address will deal with The Place of Industrial Education in a Rational School System—Arthur L. Williston, Boston. Secretary C. A. Prosser will discuss Lessons Learned from Ten Year's Experience in Industrial Education. Special sessions, the programs of which are yet to be arranged, will be devoted to the following subjects: Fine and Applied Arts, Vocational Education, Household Economics, Manual Training.

The Department of Rural and Agricultural Education announces as one of the topics for discussion: The Work in Agriculture, Home Economics, and Manual Training in their Relationship to the Program of the Rural School.

The following statement concerning exhibits indicates an intention to experiment with a feature that has for some years been recognized as a very valuable part of the annual coventions of several of the technical organizations.

The National Education Association has never attempted to feature commercial exhibits of materials and equipments. It is recognized, however, that many superintendents and schools board members are interested in examining the latest things in the way of school supplies, especially in view of the fact that more attention is being paid in recent years to the physical equipment side of the educational system. At Salt Lake City and at Richmond provision was made in a central building for those who desired to have exhibits, and the assignment of location was left to the local committee, with no effort on the part of the Association to secure exhibitors or lend them any assistance. It has been decided that in connection with the St. Paul meeting there shall be conducted what will be called the N. E. A. Commercial Exhibit Auxiliary. The same will be under the direction of C. E. Hoyt, Lewis Institute, Chicago, Ill., who for the past five years has had charge of the exhibits in connection with the American Foundrymen's Association.

The fifth annual meeting of the New York State Branch of the National Society for the Promotion of Industrial Education was held in the high school, Albany, N. Y., on Friday and Saturday, May 1st and 2nd, 1914. The special topics considered included: The Training of Teachers, Value of Industrial Education to Employers and Employes, The Technical High School, Principles Underlying Vocational Education for Girls. The president of the New York State Branch is Alfred P. Fletcher, assistant superintendent of schools, Rochester; secretary-treasurer, Matthew P. Adams, Children's Aid Society, New York.

An important series of public meetings was recently held under the auspices of the New York Vocational Guidance Association. The first was held on Tuesday evening, April 21st, 1914, at Cooper Union, with the following addresses: The Meaning of Vocational Guidance, Prof. Henry Suzzallo, Teachers College, New York; Learning to Work Thru School and Industry, Mrs. Alice Barrows-Fernandez, director of the vocational education survey, New York; Child Labor and Vocational Guidance, Secretary Owen R. Lovejoy, National Child Labor Committee. On Tuesday afternoon, April 28th, in the Milbank Memorial Chapel, Teachers College, the program included: Modern Homemaking, Mrs. Martha Bently Bruere, Department Editor, "Good Housekeeping Magazine;" An Occupational Study in the Cloak, Suit, and Skirt Industry, William T. Bawden, special federal investigator; The Future of Vocational Guidance, Prof. F. G. Bonser, Teachers College. On Wednesday evening, April 29th, Prof. E. L. Thorndike gave a demonstration of Tests for Vocational Guidance, and For the Selection of Employes, followed by questions and discussion. On Thursday evening, May 7th, at the Washington Irving High School, the following addresses were given: Homemaking as a Profession, Christine Frederick, department editor, "The Ladies' Home Journal;" Nursing, An Attractive Field of Public Service for Women, Isabel M. Stewart, Teachers College; How to Choose an Employer, Eli W. Weaver, Brooklyn, N. Y.

The Southwestern Ohio Manual Training Teachers' Association held its spring meeting at Miami University, Oxford, Ohio, April 18, 1914. About forty members were present. Prof. Whitcomb of the Manual Arts Department had an exhibit of the students' work and gave an interesting talk on the work in industrial arts. The program consisted of discussions of a list of topics sent in by the members. Special interest was taken in the proposed law to govern industrial education in Ohio. Elmer Christy, supervisor of manual training in Cincinnati, was elected president to succeed Howard G. Carter of Hamilton. Chas. A. Brennan, of Hamilton, was elected secretary. The next meeting will held in Cincinnati, October 17, 1914.

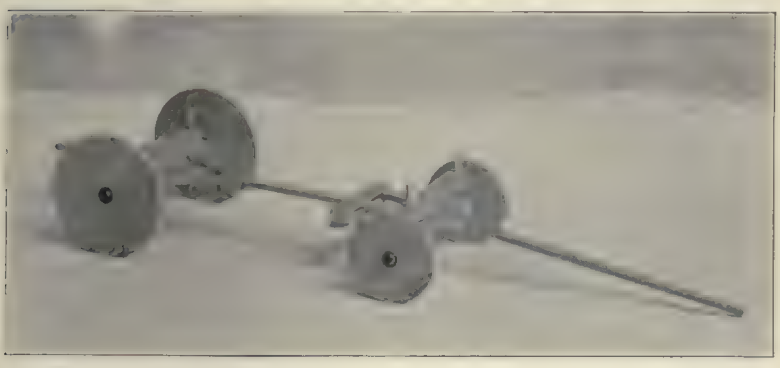
SHOP PROBLEMS.

George A. Seaton, Editor.

The following shop problems have been suggested by students at the Stout Institute for use in the Manual Training Magazine. They are designed in each case for conditions in the public schools where these lines of work are undertaken.

The problem in Wagon Making for Lower Grade Boys is contributed by George W. Drescher; the Porch Lantern for a forge class by David B. Steffens; the Compression Coupling for a machine-shop class by Arthur V. O'Brien; the Shipping Label for a printing class by Walter H. Hanke; the Garden Wall and Gate for a bricklaying class, and the Plumbing for Residence for an architectural drawing class, by Henry J. Hansen.

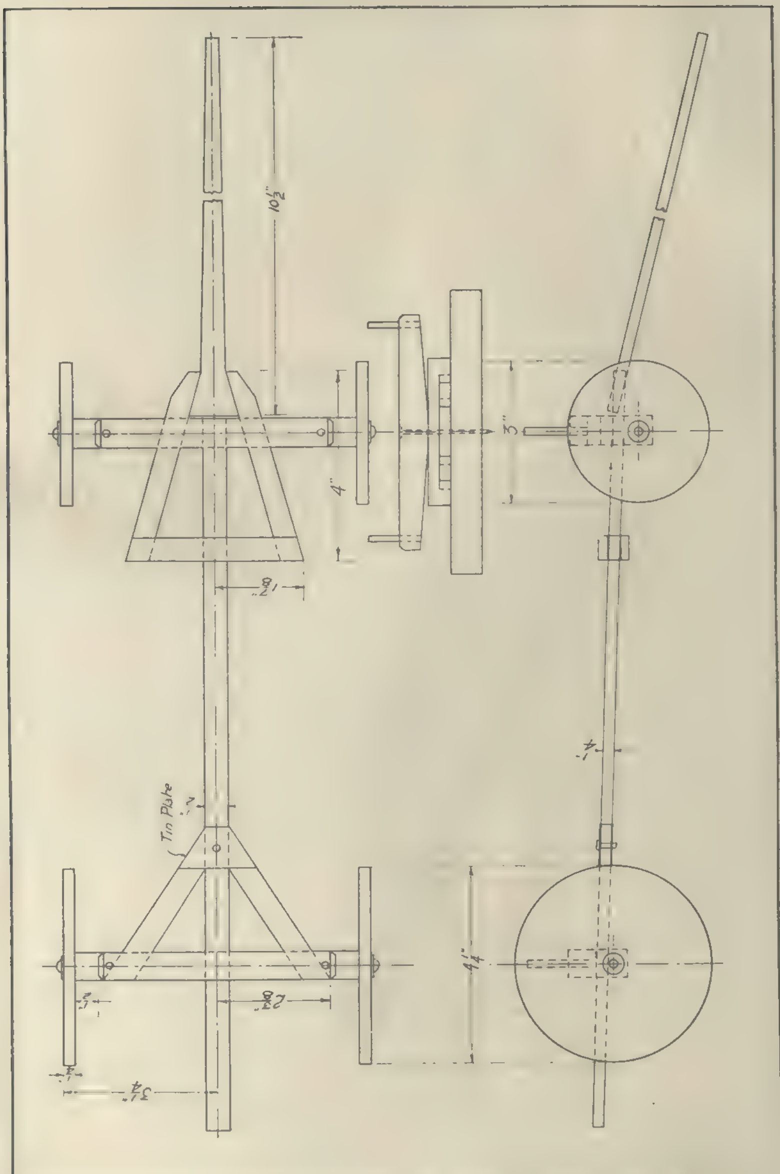
George Fred Buxton,
The Stout Institute.



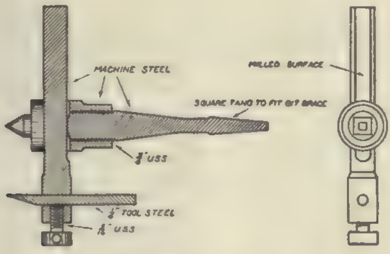
WAGON MAKING FOR LOWER GRADE BOYS.

As a manual training problem the wagon is one that appeals to the interests of the boy and also provides abundant opportunity to teach the use of the common tools. Soft wood is used and this is reduced to thickness in the mill. The principal tool processes and operations involved are: measuring, squaring, sawing, nailing, chiseling, whittling, boring, cutting wheels, fitting, adjusting, and assembling.

So far as possible the construction and operation of a full size wagon has been represented or duplicated. The bolster, tongue, and reach are made as nearly typical as practicable. The reach is made in such a way that it may be shortened or lengthened according to the length of the box or hay rack which

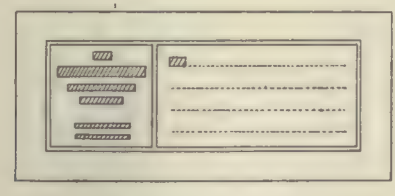

10½"
4"
3"
Tin Plate
4¼"

is to be used. The wheels are cut from ¼ inch basswood with a wheel cutter. This tool was designed and constructed especially for such problems as these. It enables the boy to cut a wheel more quickly and more nearly true than with other tools. It is adjustable and will cut wheels from 3 inches to 6 inches in diameter.



WHEEL CUTTER.

A problem of this kind fits in well toward the end of a year's work in the fifth or sixth grade, and if carefully taught and well made should suggest many lines of profitable thinking for the boys.



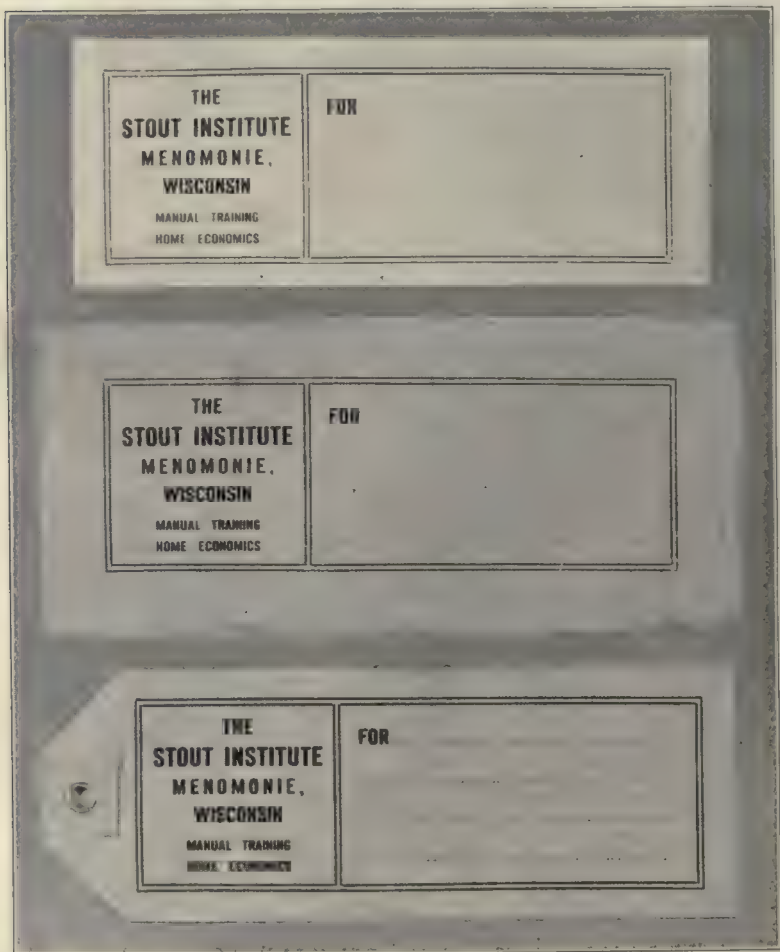
THE SHIPPING LABEL.

This exercise may be handled in the second year high school class. It is a very desirable problem to give in a printing course for the reason that it offers an opportunity for a wide range of work, namely: selection of suitable type, balance and arrangement of type matter, difficult rule work, the cutting and making of the tag itself, besides the usual processes of composition, imposition, and presswork.

In approaching this problem the pupils sketch roughly a number of small, suggestive shipping labels, each one different from the others. The relative weights and sizes of the different lines should be shown and also their approximate spacing. From the rough sketches the pupils, with the teacher's assistance, select the best design and make a detailed working plan of it, show-

ing every feature exactly as it will appear in the completed label. With this plan in hand, the pupil sets up the job.

It is well not to make the shipping label larger than 4x5 inches, and yet it must be large enough to contain all the necessary information.

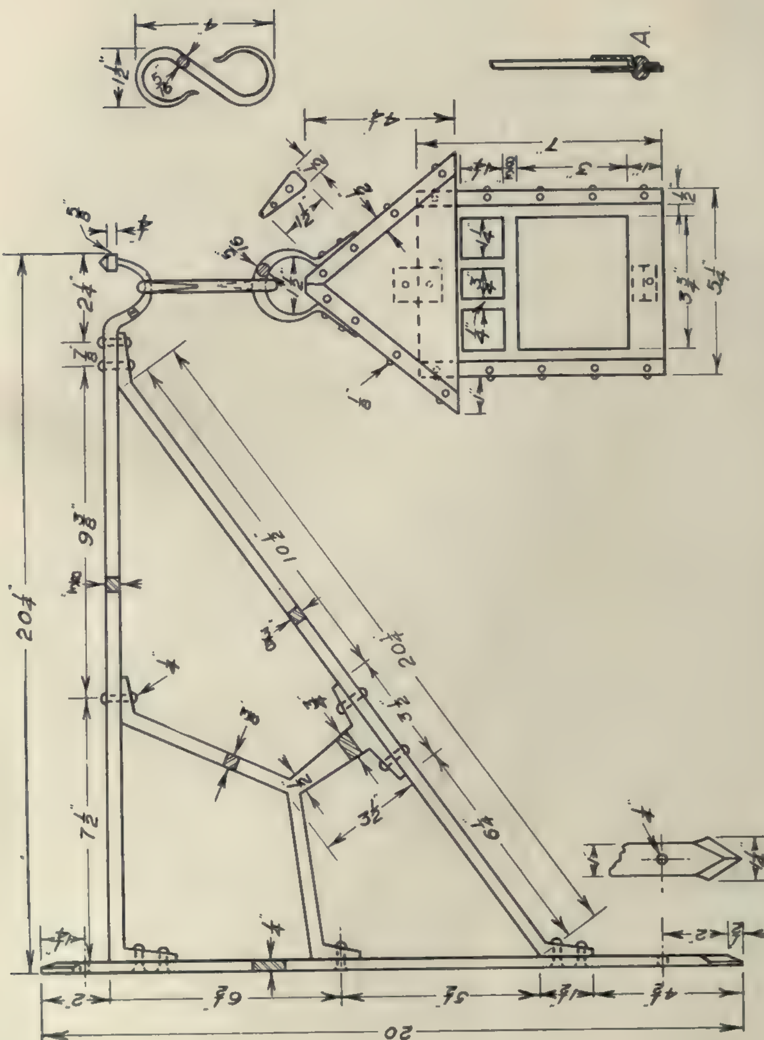


PORCH LANTERN.

A simple yet attractive design is submitted for a porch lantern and bracket which is a desirable problem in art smithing for high schools having an ordinary metalworking equipment. The material used is of mild steel thruout, No. 16 gage sheet steel being used for the lantern.

In making the lantern, cut out the sides with tinner's snips and then mark out the design on each side. Cut out the design by clamping it in the vise

at the edge of the lines and then shearing it out with a sharp cold chisel. File the edges smooth. Cut out the strips for the corners and bend them at right angles lengthwise. Fasten the sides together by riveting the top and bottom edges first, and then drill the holes in between and complete the process. Cut out the sides and strips for the top and rivet them together in the same manner. Do all riveting on the inside so that the heads will be of uniform size on the outside.


A
20

Forge out the loop for the top and rivet it in place. At the apex of the top on the inside solder in a piece of ⅜ inch piping, 1 inch long. This is threaded on the end and fitted to an electric light bulb, the bulb being put in place after the lantern is finished. The top and bottom of the lantern are then fastened together by means of two short strips riveted thru the top and the upper edge of the side. Rivet on short strips to hold in the art glass on the inside at both top and bottom as is shown in sketch A. Rivet the top one first and then inserting the glass; rivet in the one at the bottom on each side of the lantern.

In making the bracket, forge out the back and two arms and rivet them together. For the brace in the center of the bracket take a piece of stock ⅜x¾x9 inches. Split in the center from one end back 4 inches, and then square up these arms. Make them a little long so that they may be fitted in easily. Any extra stock may be cut off later.

Draw out the base to the correct dimensions. This is done by splitting the stock 1 inch back and then drawing out the two parts for the rivets as shown in the drawing. Rivet this brace into the bracket. Blacken by rubbing with machine oil. The last step will be to forge out the S hook on which the lantern is hung, making both ends exactly the same.

GARDEN WALL AND GATE.

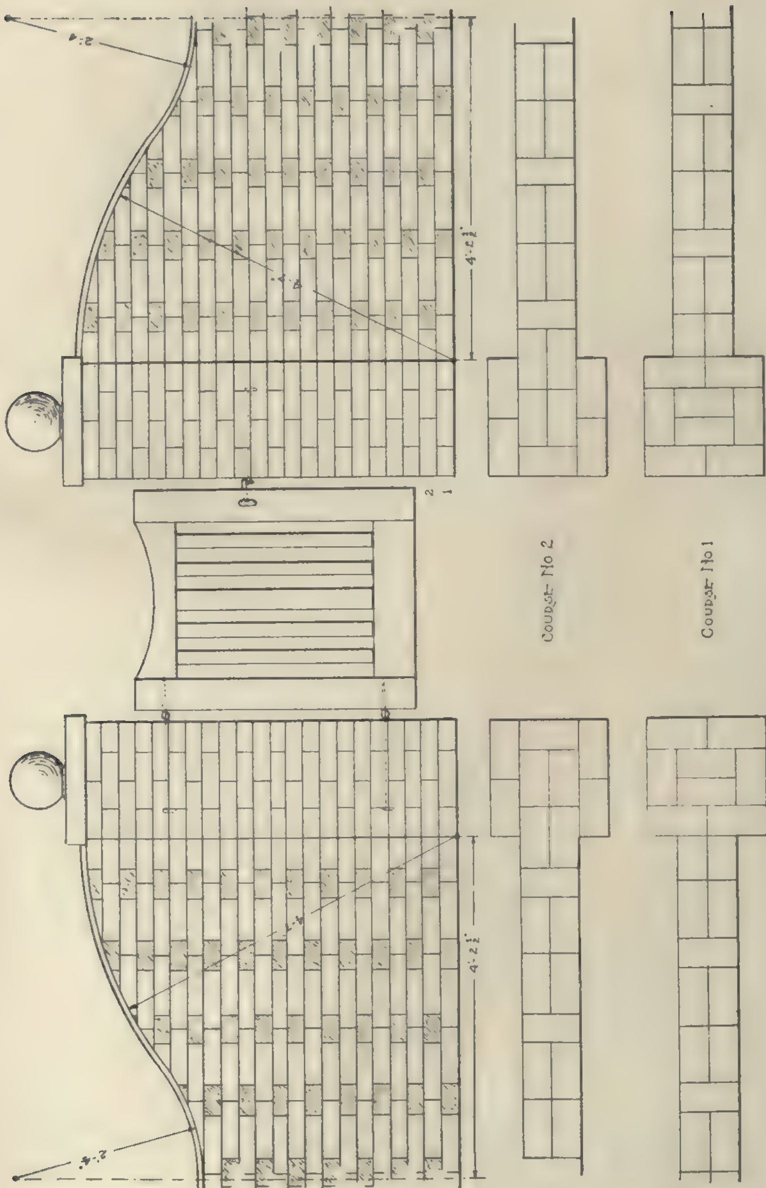
The garden wall with correlated design in carpentry and cement work is suggestive. The cement balls and slabs on top of the pilasters can be made by the cement class, the heavy wooden gate by the carpentry class, and the gate latch and hinges can be made by the forging class.

Altho any of a number of bonds can be used in the wall, a garden wall laid in double Flemish bond, sometimes called the "garden bond" has the advantage of being the most pleasing in appearance. This is especially true when the wall is built of rough-textured brick, and more so, when the headers are of a darker shade than the stretchers.

The wall could be built by using mortar of a color either contrasting with or corresponding to that of the dominating brick. If a rough-textured brick is used with a mortar of contrasting color, the rough-cut flush joint should be used; but if a smooth brick is used with a mortar of a corresponding color, the gouged-out or raked joint is preferable as the shadows cast on the joints by the brick tend to break the monotony of the wall.

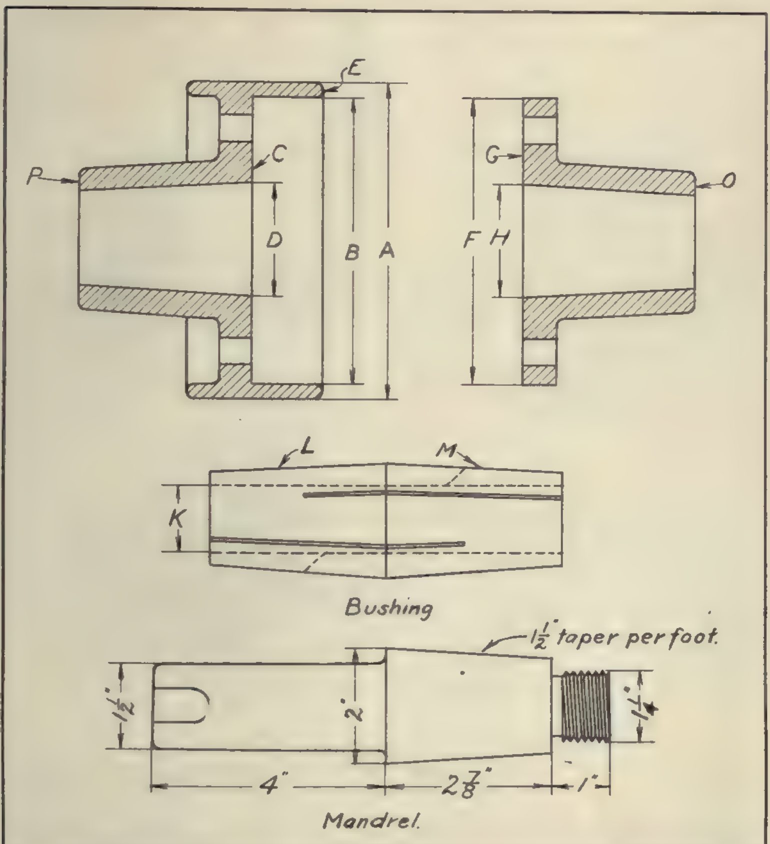
A pleasing effect can be produced by using black headers, and such headers laid in vertical lines in alternating courses tend to improve the appearance of the wall.

The wall shown in the drawing is 9 inches, with 16 inch pilasters at the openings. The pilasters show a reveal of 4 inches. If the smooth brick is used a No. 8 or No. 9 Veneer brick is advised, as these brick withstand weathering much better than the softer brick.


4' 2½"
4' 2½"
Course No 2
Course No 1

THE COMPRESSION COUPLING.

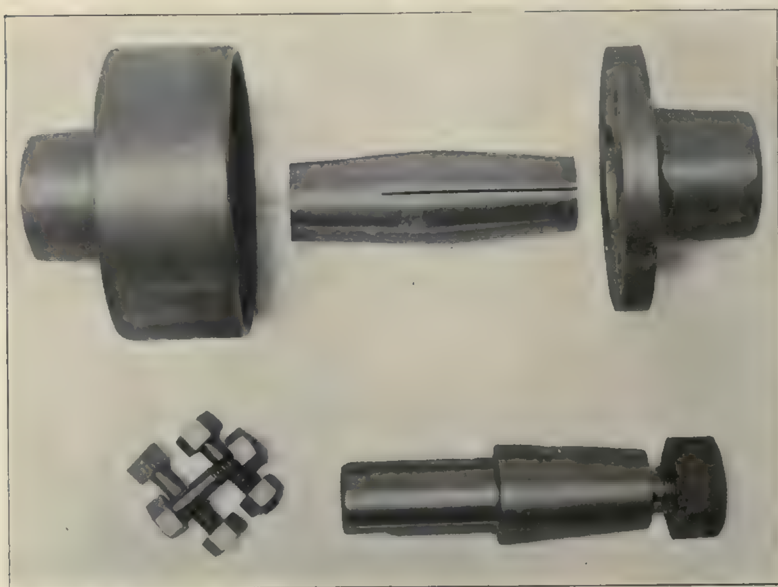
The compression shaft coupling is a problem that involves several different processes: straight turning and boring, facing, boring taper holes to fit a gage, boring and reaming a straight hole, turning external tapers to fit internal tapers, splitting with a saw on the milling machine, and laying out and drilling holes on the drill-press.



The order of operations is as follows: Chuck the large part of the coupling by the hub. Turn A, bore B, and face C, to within 1-32 inch of the finished sizes. Set the taper attachment to bore a taper of 1½ inches per foot. Bore hole D, using the taper mandrel as a gage and adjusting the taper attachment until the mandrel fits the hole perfectly. After the taper hole is finished, finish A, B, and C, and round the edge E.

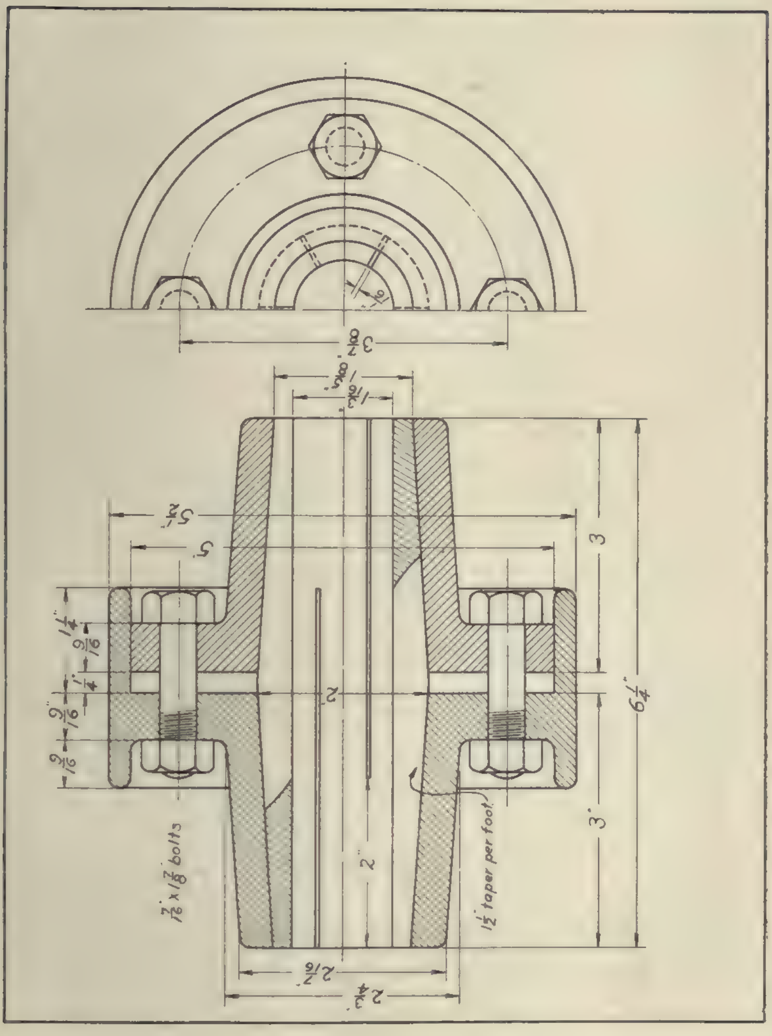
Chuck the small part of the coupling by the hub. Turn F, and face G, to within 1-32 inch of finished sizes. Bore H in the same manner as D, finish G, and turn F to a running fit in B. Reverse both parts in the chuck and face the ends O. and P. Mount both parts on the taper mandrel and finish all over.

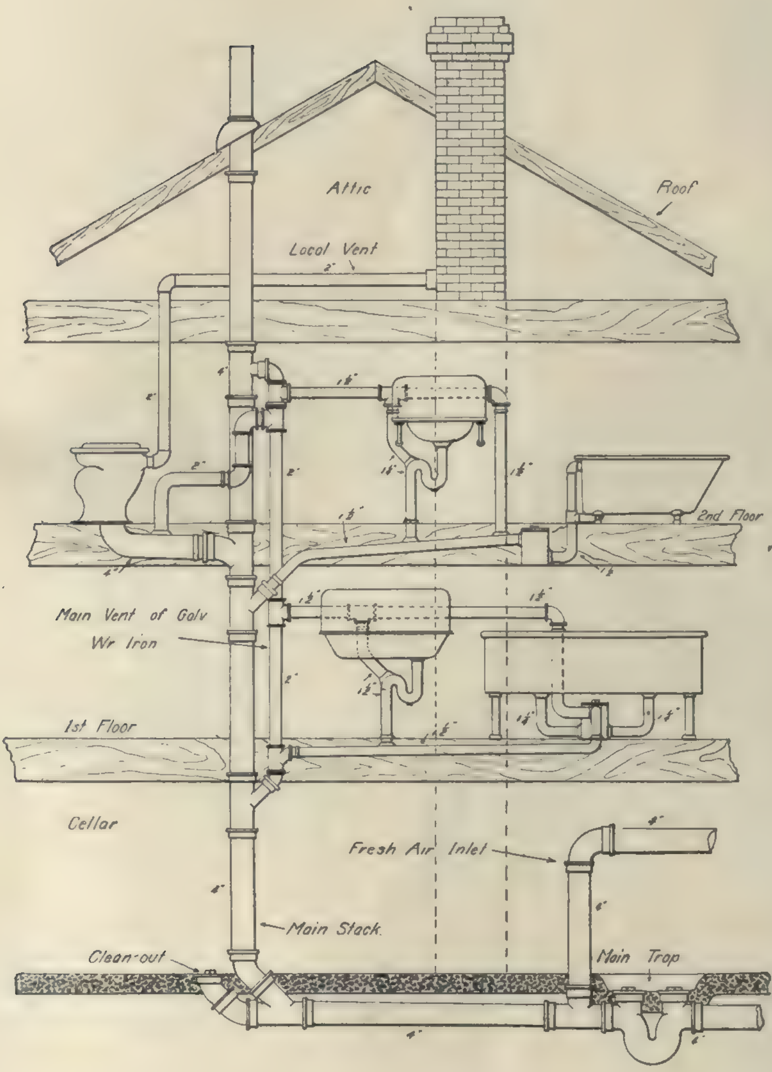
Chuck the bushing casting. Bore and ream K. Mount on a standard mandrel and turn the tapers M and L. When D and H fit on M and L there



should be ¼ inch between C and G. Hold the bushing endwise in the milling-machine vise and slit with 1-16 inch saw, making three cuts from one end 120° apart, alternating with three cuts from the other end. Lay out and drill the holes accurately on the small part of the coupling. Drill the large part, using the small part as a jig.

It is not advisable to file, finish or polish this problem, as it is not typical of this class of work. The finishing cuts on the outside should be made with a wide tool using as heavy a feed as possible without chattering.


7/16" x 1 7/8" bolts
1 1/2" taper per foot
6 1/4"
5 1/2"
5"
3 7/8"
2 3/4"


Attic
Roof
Local Vent
2nd Floor
Main Vent of Galv
Wr Iron
1st Floor
Cellar
Fresh Air Inlet
Main Stack
Clean-out
Main Trap

PLUMBING FOR RESIDENCE.

This problem is suggested for a high school class in arichtectural drawing.

Each system of plumbing installed differs in some respect from any other installation, altho all are based on the same fundamental principles. Each installation has its own peculiarities which must be considered in planning the lay-out and each lay-out can be planned in many different ways. It is therefore essential that the instructor know how to overcome these difficulties and at the same time have his pupils plan an installation which will work perfectly and be sanitary in all ways.

The accompanying drawing shows an installation with a house or main trap with its accompanying fresh-air inlet in the basement; a set of trays and a sink on the first floor, and a bath-room on the second floor. The closet bowl has a local vent connected to it which serves to carry off all foul odors from that source. All traps are metal and the pipes of ample size to carry away all the waste matter. The main vent pipe is of galvanized iron as are its branches to joints directly over the traps they serve. The soil stack, house drain, and fresh-air inlet are of cast iron soil pipe. The main vent stack connects into the soil stack above the highest fixture, and the waste from the sink and trays runs into the main vent at a point very close to where that pipe connects into the soil stack below the lowest fixture. This prevents any scale or rust from the main vent from accumulating at that point and thus clogging that pipe. By leaving a clean-out at the foot of the soil stack, the run of pipe between that stack and the house trap can easily be cleaned out in case of a stoppage at any point along that line.

CURRENT ITEMS

UNION HIGH SCHOOL, GRAND RAPIDS.

The following notes on the Union High School, Grand Rapids, Michigan, furnished by Superintendent W. A. Greeson, will interest those who are making a study of various high schools to determine which type is best adapted to modern needs.

The Union High School was planned for a typical American high school for an industrial center like Grand Rapids. It has two main and immediate ends in view; first, to offer students a broad and general education consisting not only of academic courses but having some industrial work added; second, to furnish an opportunity for some specialization along commercial and industrial lines, by making a product of commercial standard, such that the student will be fitted to do some definite work in the commercial or industrial institutions outside of school. The first end will very naturally cover the requirements for college, as it does; while in the second, boys and girls can not only discover the field in which they are best fitted to work naturally but be fitted to earn a living by having more than an elementary training in some one course. This specialization we aim to make an important feature; our courses of study and equipment make this possible and in addition to this members of our teaching corps are industrially trained and experienced.

Because of the presence of a large number of eighth grade pupils in this building we are able to offer them some of the high school work. They all have the regular manual training courses in the grades, special students being placed in two ungraded rooms, working with the high school industrial classes. In this way an elementary school is unnecessary in this part of the city. The eighth grade is managed as part of the high school. More of these pupils are held in school and their needs more readily met by offering them this wider range of work.

Our courses of study include the regular amount of work offered in the standard high schools of this country; we have four years of Latin, German, science, history, mathematics, commercial subjects and French. Freehand and mechanical drawing, elementary machine design, arts and crafts in leather and brass as well as elementary jewelry, are offered to all. Two years in forge work and machine shop, the same time in pattern-making, wood-turning and cabinet-making and the history of furniture styles are open to the boys. The girls may take courses in sewing, dressmaking, millinery, laundry, and advanced work in domestic science. For graduation we require that each student shall have had work in English, history, science, mathematics, and applied art or industrial work. The teaching force of 34 people is composed of men and women of fine training and experience; of this number sixteen are men.

Our shop courses have been received for advance credit in the engineering department at the University of Michigan and other technical schools, and our graduates now hold some excellent positions in the commercial and industrial institutions of the city. The industrial courses are given five double periods, or one and

a half hours daily five times per week, the shop mathematics and drawing being given with the shop practice so that they may be closely related. In the girls industrial courses art is made a required and related subject. We expect physiology, hygiene, botany and chemistry to precede or accompany the course in domestic science.

A marked feature of the work is an evening technical and trade school. An enrollment of nearly six hundred was reached last year, the first year in which industrial courses were offered. Work in machine shop practice and tool making, forging, mechanical and free-hand drawing, machine design, rod making, electrical construction, sewing, and dress making, millinery and cooking were given.

We feel that by our plan for the day school students as here presented, an excellent opportunity is offered for the young men and women, who do not know for what they are naturally fitted, to find themselves. In the cities where there are specialized high schools, students are forced to choose their work at the close of the grammar school. Here they are able to defer a choice until after entering high school.

REORGANIZATION OF SAN FRANCISCO HIGH SCHOOLS.

The San Francisco high schools began the current year under a new plan of organization which includes a number of unique and significant features of general interest. The plan as a whole is very broad and flexible and shows an intent to serve all classes of students. The program is divided into groups, as follows: group A.—general, designed to allow a student to test his capabilities in manifold directions, and to inspire him with the desire for education beyond the high school. Its provisions open the doors to wide, yet thoro trial of the branches of instrucion offered by our high schools. Every restriction upon, and bar to, the student in the form of arbitrary exactions has been removed. At the same time, the prescription of forty "hours" of "advanced subjects" imposes a restraint upon superficiality and waste of time. Under the provisions of group A a student is permitted to turn in a different direction from that originally intended, without loss of time or standing, in accordance with newer life-plans, late in the course; group B optional, designed to allow much freedom to a student before he need ultmately conclude whether to extend his formal education beyond high school, or not to do so; group C—occupational, designed to afford thoro preliminary instruction and drill to a student desiring a technical, scientific, or commercial education; group D—College of science preparatory; group E—inclusive college preparatory; group F—two-year commercial—industrial; and group G—one-year commercial—industrial.

In the last two groups is found provision for students who find it impossible to finish a high school course. Should circumstances permit their doing so before the end of their courses they may easily enter one of the other groups and continue.

A student is assigned to one of the high schools as a registry school, but by an "interlocking" system, he may pursue studies not furnished in the registry school in one of the other high schools. By this means more intensive work in

certain departments is possible for given high schools without duplication of equipment or teaching force. For example, if a girl is registered at the Lowell school as specializing in "fine arts" and desires to study Spanish she may go for that subject to the Polytechnic or Commerce high school. A boy registered at the Polytechnic high school and majoring in mechanical arts, might if he desired take Greek at the Lowell school, or Commercial history at the Commerce school. There is sufficient duplication of general subjects, however, to make going from one school to another the exception rather than the rule.

Another interesting feature is the "continuation plan" by means of which "students *who* present evidence that they are *actually* and *seriously* employed in an occupation outside of school during a part of the regular school day, but only such, while their school work remains of a satisfactory character, may be allowed to register for a single half-day session in any San Francisco high school, provided that they include not less than eight hours or more than sixteen hours per term in their program; and to such students, upon the completion of one hundred sixty hours of work, according to the provisions of any one of groups A, B, C, D or E, will be granted a regular diploma and such recommendations to the universities as they may have earned."

These students will be given a monthly report for employers. This continuation plan will especially appeal to those taking the one or two-year courses as a means of continuing their work in school without the expense of a total use of time which they need for remunerative employment. The school authorities believe that they will encounter no difficulty in securing the cooperation of employers in the working out of the continuation plan. The board of education hopes to extend the plan in the near future.

Thus by means of the "interlocking" system, the one and two-year courses, and the "continuation plan," the high schools of San Francisco are making a decided effort to provide liberally for the needs of students who are forced to early employment. President A. A. D'Ancona, of the Board of Education, and Superintendent Alfred Roncovieri, to whose persistent efforts the adoption of this reorganization scheme is largely due, are to be congratulated on the achievement of such an "open-door" plan. It is to be hoped that they will complete their contribution to the solution of secondary school problems by keeping records of increased attendance, proficiency of students, and other follow-up data.

GERMAN TRAVEL STUDY TOUR.

The interesting itinerary offered by the German Travel Study Tour of New York University has tended to make this a very popular form of summer work for teachers, judging from the large number who are planning on taking the course. The party will leave New York on July 2nd on the North German

Lloyd S. S. Barbarossa due in Bremen on July 12. The itinerary in Germany includes Berlin, Dresden, Leipsic, Halle, Jena, Nuremberg, Munich, Heidelberg, Mannheim, Frankfurt and Cologne. In each of these cities the various types of German schools will be visited. Committees of prominent German educators have been organized in each city and will co-operate in this work. Students who complete the required reading and submit a satisfactory thesis will be given credit towards a degree for the work. The main party will reach New York on their return on August 17, but those who desire to make a longer trip may take one of the extensions which have been planned through Switzerland and France, and Belgium and France requiring a week's more time.

A NEW FOUR-YEAR COURSE FOR TEACHERS.

Bradley Polytechnic Institute has recently made an important announcement concerning courses for the training of teachers of manual training and industrial subjects. Beginning with next September a prospective teacher may pursue a four-year professional course of college grade, and at its end receive the B. S. degree. This change is due to the growing demand for college-trained men in manual training work, and the number of requests that have been made for such a course. The new course does not change the two-year course nor the three-year course now in operation. It simply adds a new and higher possibility. A feature of the new course which will be much appreciated is the arrangement whereby it is possible to elect enough work in athletics to prepare one to successfully direct the work of high school athletic teams. Normal instruction in this department will be given by Professor Fred C. Brown. Or instead of athletics one may specialize in mathematics or science or history in addition to manual arts. One-half of the entire time of the course will be devoted to manual arts and industrial subjects and one-half to other subjects. Graduates of the two-year course will be able to earn their degree in two additional years by spending most of the time on subjects other than the manual arts.

The manual training department of Somerset, Ky., high school consisting of work in forging, pattern making, woodturning, bench work. mechanical drawing, architectural drawing and construction, cooking and sewing, has been further enlarged by the addition of a complete printing plant. The print shop does all printing for the school board, local merchants, and the school paper. The entire manual training equipment has been improved by the installation of new induction type motors on three phase current. All wiring is being done by students under direction of the supervisor. Plans are under way for the addition of a complete machine shop to be ready for use at the opening of school next fall. The classes in forging, pattern making, woodturning, and bench work make frequent trips to the shops of the Queen & Crescent Ry. which are interesting and instructive to the students in their work. L. J. Inman is director of manual training in the Somerset high school.

IN THE EVENING SCHOOL, LANE TECHNICAL HIGH SCHOOL, CHICAGO.
Photograph by George G. Greene.

The furnace shown on the opposite page which is used in the foundry work at the Lane Technical High School, Chicago, has the advantage of having a seventy-five foot stack. The result is that the natural draft is sufficient to bring a charge of five hundred pounds of iron to such a heat that when the blast is turned on the iron is ready to pour in two minutes.

IN THE EVENING SCHOOL, LANE TECHNICAL HIGH SCHOOL, CHICAGO.

IN THE EVENING SCHOOL, LANE TECHNICAL HIGH SCHOOL, CHICAGO.

The booth shown in the accompanying photograph was an interesting feature of the Tulare County Citrus Fair, at Visalia, California. The fair lasted ten days during which time regular class work was conducted in the manual training booth, under the direction of George B. Holmes, the instructor

MANUAL TRAINING EXHIBIT BOOTH, TULARE COUNTY CITRUS FAIR, VISALIA, CALIF.

in the subject. Adjoining the shop booth was a living room twelve feet square, furnished by the work of the boys. The furniture included the following pieces: library table, hall clock, settee, morris chair, footstool, taboret and book-rack. Posters were displayed announcing that the department was prepared to do odd jobs of repairing and to fill orders for furniture and similar articles.

This form of publicity is increasing in use in various sections of the country and serves to educate the public as to some of the newer ideals in school work.

FOREIGN NOTES

H. Williams Smith.

In the House of Commons, Mr. Hoare, a conservative member, said he would like to see manual training adopted in every elementary school. Mr. Trevelyan, a Liberal, and a Government Minister, rejoined, "So would I; and it is coming." We know, of course, that politicians, sometimes, are never less definite than when they tell us something is coming. But here is a case where party does not appear to count. When a Conservative says he wants something and a Liberal says "so do I," there seems a reasonable probability of that thing eventuating soon. Lord Macaulay, whose sister was this young Trevelyan's grandmother, once wrote in his poem of Horatius, "Then none was for a party, then all were for the state." So far as manual training is concerned, Home Rule has every cause to envy it.

In Government reports on education, the screw is now being applied to delinquent authorities as regards manual training. Of Barry, Wales, a report reads: "No provision has been made for the instruction of boys in handicraft, and the authority should seriously consider the possibility of supplying the omission." It isn't "desirability" any longer.

Queen Mary is very fond of skimming around to pay visits to benevolent institutions. She is a motherly kind of soul, and the British public likes her the better for it. Recently, while the King went to see a football game, she visited the Home for Crippled Boys at Blackheath. She was conducted over the whole building and saw the boys at their various occupations in the workshops. She was very interested in what she saw, and complimented the little workmen. It is hardly to be expected that the officials of such institutions really enjoy the Queen's visit so much as do the inmates, for the worry must nearly offset the honor. But the practical interest shown by King George and his wife in the lives of the people will do much to make that people cherish the institution of monarchy; an institution which in theory seems a ridiculous survival from antiquity, but which in practice works out better than most republics.

Staffordsire was one of the pioneers in school gardening, and has now 238 such classes in connection with its primary schools. In the Black country patches of waste and unsuitable ground have been converted into prim and productive vegetable gardens. They who have traveled through the Black country will receive such news with joy and gratitude. Inspectors have been greatly impressed by the valuable training involved in the work done, and also by the educational possibilities which the working of the classes brought to light.

At St. Albans' Grammar School the manual instruction room is situated in the ancient gate house of the old Abbey. At Whittington, in Derbyshire, the

old club room of the village hostelry is used as a school handwork shop. These are not solitary instances, and they go to prove the perennial adaptability of the English nation to new ideas. It is even as Lowell sings:

New occasions teach new duties; Time makes ancient good uncouth;
They must upward still, and onward, who would keep abreast of truth.

An experimental scheme of needlework instruction has been carried out in 20 selected departments in London primary schools during the past two years, and has proved so successful that it is proposed to extend it to the whole of the schools throughout the county of London. It is considered that the experiment has proved that needlework supplies the most useful means in training hand and eye in girls' schools. It is estimated that the cost of supplying the necessary equipment to all schools will amount to £7,810. The equipment includes tables for cutting out and pressing, heaters and irons, two sewing machines for each school, and tape measure, thimble and scissors for each girl. Cost of materials is met by the sale of the garments made.

There are 422 Domestic Science centers and 250 Handicraft centers in the county of London.

Read what a London man writes:—"Handwork and nature study, I contend, are responsible for a great deal of the slipshod work done in the schools today. There is no time for these subjects. To teach nature study in London schools seems absurd to me; the natural conditions are absent. Handwork and symbolic arithmetic seem to be tremendously overestimated. An occasional model to illustrate a lesson, and a certain amount of practical work in arithmetic are eminently desirable, but the elaborate system of handwork so largely carried out today quite smothers the intellectual object to which it is meant to attain. Instead of being a *means,* this work is actually made an *end.*" Poor fellow! What can be done for him? His case seems hopeless. I guess there are a few Americans cast in a similar mould to his. Is it any good to tell these people a few things? The "Slipshod work" is mostly due to out-of-date methods of using up-to-date educational instruments. If "there is no time for these subjects" we must make time. "To teach nature study" in cities is not absurd; the rivers, the parks, the animal life, the sky, even in cities, give the lie to the statement that "the natural conditions are absent." There is an involution of thought and word in one part of the writer's criticism. He really means that it is "eminently desirable" that the illustrative model should be very rarely "occasional," and that the "amount of practical work" should be *uncertain.* We know his type only too well. He says that handwork "smothers the intellectual object." My word! If it would only smother educational Rip Van Winkles such as he we could be well content. Then, handwork "is actually made an *end.*" Of course it is, and a means too. Is not every subject in the curriculum both an end and a means? But "so much for Buckingham!" he serves to point a moral if not to adorn a tale.

Another writer is in a more hopeful case, for he has a sense of humor. In poking fun at correlation he says:—"For instance, in a handwork recitation lesson, to teach, say, 'The Village Blacksmith,' half the class can make clay models of hammers and anvils, while the other half cut out horseshoes in cardboard and print 'Good Luck' on them with colored crayons. In a handwork mental arithmetic lesson, to find, for example, the cost of a dozen loaves at 23d each, the children might make twelve miniature loaves in papiermache, cut them up into slices, and spread the slices with 'gloy' (an adhesive paste)." This is excellent fooling, nor is it without some justification. Most of the silly things are done in school handwork when using it as a *means.* And many handwork teachers are all too willing to see their subject so prostituted. That's a strong word, but I feel very strongly about the matter, and a word as descriptive, but milder does not occur to me. An English educationist has well said that handwork should be the queen and not the handmaiden of school subjects. The one great reason why people have not a good enough opinion of us and our work is that we have not a good enough opinion of it ourselves. It is high time that we quit going to school authorities cap in hand, and followed Dr. Busby's example, who kept his hat on his head in the presence of King Charles 2nd, lest his pupils should think that anyone could be above their master.

It is hardly surprising that *The London Teacher* is still Laodicean in its attitude to school handwork. Its lukewarmness is expressed as follows: "Many teachers are bewildered by the demands for nature study and handwork, to name only two, and these possibly the best of the latest additions to the curriculum." The rejoinder is obvious, that when educational experts provide reforms in educational procedure, they are under no obligation to provide the teachers with brains to comprehend those reforms. "Good Master Reformer" says Scholasticus, thou bewilderest me." "Verily, I am sorry for thee," says Reformer, "but I can only adjure thee if thou hast any brains, to use them." You will note the generosity of *The London Teacher* in the use of "possibly." Possibly, too, some day, educational journals may lead the van of progress, and not drag far in the rear among disreputable camp-followers.

A writer in the *Parents' Review,* Mrs. Claude Epps, is strongly of opinion that the "domestic or home science should be regarded as having a place among the natural sciences." She would insist upon a course of cookery and household management for all girls, either towards the end of their school career, or, preferably as an after school course. She would like to see every small child begin the scientific side of its education with nature study.

REVIEWS

The Book of School Handwork, Volume I, edited by H. Holman. Caxton Publishing Company, London. 9½x6½ in.; 240 pages each; price per volume, 8s. and 6d. in London. (See April number, page 348, for general review of the work).

Anyone who carries in his mind even a very imperfect picture of the traditional life at an English public school and at the same time is interested in the progress of handwork in education cannot fail to take notice when he reads in this book the chapter written by the headmaster of Eaton, Dr. Lyttelton on "Handicraft in Education." It is not so much what he says as the fact that *he* says it. He, the headmaster of one of England's most famous schools, has discovered the satisfaction in feeling a tenon fit perfectly into its mortise after planning and measuring and cutting and testing. He has discovered that there is more satisfaction in this than in "faint and feeble groping among the rules of syntax" not merely because the work involves bodily exertion, but because there is a certainty and precision in the verdict of "well done" or "ill done." He also sees in handwork, through its orderly presentation, the possibility of preparing in nature's own way for the generalizations which science demands of the student. He sees that it autimatically punishes carelessness, teaches humility, but gives encouragement, and "counteracts the one-sidedness and fallacious glory of the merely bookish training." The source gives these statements special value.

In the chapter on the "Scientific Bases of Practical Educational Handwork," Sir John Cookburn discusses the connections between the hand and the brain, character and action, and the cooperative use of the hands. Sir Philip Magnus in the third chapter discusses the need of handwork as a preparation for vocational training. He makes a plea for a broad education at the bottom. He notes that the introduction of manual training has had a marked effect upon the theory and ideals of education, and while he urges more and higher practical instruction in trade and continuation schools he says that every sound educator would deplore the premature introduction into our schools of 'vocational training.'"

The fifth chapter by Professor Green of Sheffield deals with the pedagogy of handwork, and the sixth chapter by Inspector Ballard, author of *Handwork as an Educational Medium*, discusses the class teacher and handwork. The latter is so full of sound advice that we wish it were twice as long. As a sample he says, "Originality does not start with nothing; it builds upon the resources already acquired through imitation." Again he says, "pupils should not be left to find out things for themselves but led to find out things for themselves." Finally he gives as the first and great maxim, "Treat the handwork course as a series of problems—problems to be solved not by the teacher, but by the pupil * * * it is essential that the pupil should feel it as *his* problem."

Then follow the chapters on the several phases of practical work, beginning with Sandwork, by Bertha Pugh. While this chapter is not long, some of its features will be new to most American teachers, especially, perhaps, the ele-

mentary moulding and design work in sand. Toy-making for Kindergarten and junior classes by Ethel Dixon constitutes the eighth chapter. For the most part these toys are miniature representations of household furniture, utensils, etc., but they include dolls, and for the older pupils, carts, automobiles, etc. In chapter IV Ebeneezer Cooke, former associate of Ruskin, and whose death has recently been announced, presents the beginnings of brushwork in a series of plates, some of which are in color. A chapter on Weaving follows, by Reurietta Brown Smith and Mildred Swannell. A chapter on Rough Carpentry as an introduction to woodwork for schools is by T. S. Underwood. This is what has sometimes been called "chicken coop work" in this country, and is a subject upon which information is often being sought. The models include packing cases, stools of various kinds, hen coops, steps, troughs, rough sleds and the like. Mr. Vaughan follows this with a well illustrated chapter on pencil and pen drawing in which he gives a list of objects suitable for drawing, and groups them into three stages. Domestic Handicraft for Girls, in paper, cardboard and wood, is treated by James Bowman. This includes the use of some metal working tools in making minor household repairs and in bending and soldering. "Wool Spinning for Schools" is presented by Montrina A. Bone of Sheffield University. The final chapter is on Constructive Geography and is written by J. W. Page.

It is easily possible for an American teacher to find defects in courses and methods presented in this volume, but in doing so he would shoot beside the mark, because the purpose of the editor is not to present a single scheme which he regards as the best, but to bring together in six volumes for reference and study all the various types of methods and courses in England that are worthy of consideration. Such a task has never been undertaken before in any country, and deserves high commendation.

—C. A. Bennett.

Modern Technical Drawing by George Ellis, author of *Modern Practical Joinery* and *Modern Practical Carpentry*, etc., D. Van Nostrand Co., New York, 1913. 7¾x5½ in.; 200 pages; price $2.00.

The author of this book is a well known English writer and lecturer. As stated in the preface "this work is designed to fulfill a definite need for practical instruction in Builder's Technical Drawing."

It consists of a classification and explanation of the various kinds of technical drawing, the use of the instruments and lettering. Orthographic, isometric, and oblique projection have been discussed, and numerous examples of each given. Practical perspective and freehand drawing for artisans are also treated briefly. The chapters on geometry and workshop drawing should prove especially valuable to the practical worker. It should be remembered, however, that while the book contains many useful and helpful suggestions to teachers and will be valuable to practical wood-workers, it would hardly be practical for classroom work in this country, because of its terminology and methods of procedure.

It is profusely illustrated.

—F. G. Elwood.

Apprentice Instruction in the Manila Bureau of Printing, by Samuel H. Musick, Craftsman Instructor, Bureau of Printing, Manila, P. I. Manila, Bureau of Printing, 1913, pp. 22.

This excellently printed pamphlet describes the efficient system of vocational education adopted in the government printing office at Manila. This system was inaugurated by John S. Leech. The many details of printing and allied trades have been carefully studied and classified into "specialties" and "sub-specialties." The eight trades taught are those of printer, pressman, bookbinder, photo-engraver, stereotyper and electrotyper, engineer, machinist, and electrician. These trades are split up into 302 specialties and 1,149 sub-specialties which are grouped according to systematic progression over a period of four years. The first three years are divided into six classes of six months each in which certain specialties are mastered. In the fourth year the pupil is classified as a Junior Craftsman and the time is devoted to a review of the work of the three years of apprenticeship, with such additional work of a more responsible nature as the individual is able to handle. "The attitude of a craftsman instructor toward an apprentice is similar to that of a teacher to a pupil in a school—carefully explaining every operation. The apprentice is never forced to acquire his knowledge thru chance contact with other workmen." Apprentices are required to attend a night school and are examined monthly on required readings in English.

Such a plan as this carried on in the heart of a big industry, with a proper regard for the apprentice as a future individual carftsman as the keynote, can not but be productive of good results. Those interested in vocational education, whether in corporation schools, private trade schools, or in the public schools would gain much from a study of this system.

L. W. Wahlstrom,
Francis W. Parker School, Chicago.

RECEIVED

Thirteenth Annual Report of the Director of Education, Philippine Islands, by Frank R. White. This contains statistics and other information concerning the remarkable system of industrial education in the Islands. It is illustrated with many halftones.

Industrial Fiber Plants of the Philippines, by Theodore Muller. An illustrated description of the chief industrial fiber plants of the Philippines, their distribution, method of preparation, and uses. Bulletin No. 49, 1913, Bureau of Education, Manila.

Annual Report of the Public Continuation Schools of Wisconsin, by Warren E. Hicks, Madison, Wis. Bulletin No. 7 of the Wisconsin State Board of Industrial Education.

Report of a Special Committee on Industrial and Technical Education. Public School Board, Calgary, Alberta, Canada. This deals with schools in the leading cities of the United States.